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ARCHIE IN THE A.E.F.

The Creation of the Antiaircraft Service of the United States Army, 1917-1918

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The Creation of the Antiaircraft Service of the United States Army, 1917-1918

by Major Charles Edward Kirkpatrick

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FOREWORD

Major Charles C. Kirkpatrick, a military historian, has served as Instructor of Military History at the United States Military Academy and as Instructor in Tactics, Air Defense Artillery School. He has done a great deal of research on the history of Anti-Aircraft Artillery and is uniquely qualified to write its history.

This book was a major undertaking and is the first of what will be a series on the History of Army Air Defense from WWI to the present. The intended use is to give members of the Air Defense Artillery Branch a single authoritative source document for the history of the branch and to provide for the general education of the US Army at large on the evolution of weapons and doctrine.

JAMES P. MALONEY
Major General, USA
Commandant

Ft Bliss, Tx
31 May 1984

PREFACE

The acknowledgement of intellectual debts is a ritualistic part of research because the student has felt the hands of his mentors and friends guiding his work. A very considerable number of people have been of assistance to me in this project, and it is incumbent upon me to acknowledge the intellectual debts I owe my mentors and friends.

My unreserved thanks go to my wife, Carol, who has not only helped with my research and tolerated being a sounding board for the many paragraphs which simply didn't work, but who has also been an objective critic whose suggestions have improved the text. My friends and colleagues at the Military Academy have listened patiently, discussed the project in the light of their own specialties, and made many helpful suggestions. My good friend, Major Gregory Fontenot, served as my chief editor, ruthlessly weeding out that which I considered elegant in favor of that which was stylistically good. Should any elegant prose remain, he should not be blamed. Lt. Col. Robert A. Doughty, Deputy Head of the Department, Col. Walter Scott Dillard, Associate Professor, and Prof. Maurice Matloff, Visiting Professor of Military History, read the manuscript and made valuable criticisms. Capt. John Bonin pointed out to me some useful references. I am also grateful to Brig. Gen. Thomas E. Griess, recently retired Head of the Department, and Col. Roy K. Flint, present Head of the Department, for giving me the opportunity to carry this project through, for their full support and encouragement, and for their advice at various points in the writing process.

A Study of the Antiaircraft Service of the A.E.F. was first suggested to me by Mr. Sam Hoyle, the Director of the United States Army Air Defense Museum at Fort Bliss, Texas. Without his enthusiasm and support the project could not have been completed, for he was untiring in finding the funds and the official support at Fort Bliss and the Department of the Army to make the research possible. Mr. Hoyle also made available to me the resources of his museum's research collection, and in that connection I must also thank Mr. Richard Fritz, the curator of that collection, for all of his kind assistance.

The help of many archivists and librarians was instrumental. The staff of the U.S. Army Military History Institute at Carlisle Barracks, Pennsylvania, comes immediately to mind. Dr. Richard J. Sommers, archivist, and his staff, Valerie A. Metzler, David A. Keough, and James A. Kegel, led me through their excellent collection, answering all of my questions and suggesting additional areas for investigation. Mr. Randy W. Hackenburg, the Assistant Curator of the Photographic Archives at Carlisle Barracks, was likewise very helpful in the search for relevant photographs.

The staff of the Navy and Old Army Branch of the National Archives and Records Service was equally helpful. I extend my thanks particularly to Mr. Tim Nenninger and Mr. Bob Matchette, archivists who superintended the greater part of my research work and microfilming. Historians on the staff of the Chief of Military History in Washington welcomed me to their offices as if I were the prodigal son returned, and I deeply appreciate the support of Dr. Brooks Kleber, Deputy Army Historian, for my project, and the open-handed assistance given me by Mr. John Wilson of the Organizational History Branch.

Mrs. Robyn Babcock deserves special recognition for her long-suffering work in typing and retyping the manuscript. My thanks also to the staff of the U.S.M.A. Library, but particularly to Charlotte Snyder and Linda Thompson, of the inter-library loan office, who have over the past four years found the unfindable for me.

I am grateful to those veterans of World War I who were so kind as to grant me interviews and correspond with me, and I am also indebted to the families of other veterans, from whom I have obtained valuable information and the loan of cherished artifacts.

I must belatedly express thanks to the professors who introduced me to the fascinations of history and taught me my craft, but particularly the late Prof. James Gordon McDowell of Wake Forest College and the late Prof. J. J. Mathews of Emory University, superlative teachers who are largely responsible for whatever merit my work may have. Where I have failed in craftsmanship, it is because I have incompletely assimilated their tutelage.

Finally, the views and conclusions of this study are mine and do not necessarily represent the positions of the United States Army or the Department of Defense.

INTRODUCTION

> "Why antiaircraft guns were called "Archies," except that it was a contraction of Archibald, could never be learned. Who Archibald was, and why his name was made so memorable, no one seemed to know".
>
> —Col. William Barclay Parsons, D.S.O.
> Commanding 11th Engineers, 1918

It was the pilots' generic for bursts of antiaircraft artillery, those evil-smelling eruptions of smoke against an otherwise clean sky which meant that men on the ground were trying to kill them. The term itself derived from a popular London music hall tune of 1915, in which a young lady sought to preserve her virtue. "Archibald? Certainly Not!" was the memorable refrain which the pilots carried back to the front with them and applied to a more grisly situation. "Archie" was a term of derision, but one by which all antiaircraft artillery eventually came to be known.[1]

Archie was called into existence in response to the war planes of 1914-1918, and for some reason everyone's A.A. service has since come to be known better than the American one. In World War II, the flak was "so thick you could walk on it," and Americans showed the German A.A. arm considerable respect. Well they should, for fully half of all of American bomber losses resulted from ground fire[2]. American A.A., on the other hand, moved in the shadows, and little is known about it in either World War. Unquestionably, part of the problem lies in the undeniably unglamorous nature of the antiaircraft artillery. Of all of the arms, only the A.A. artillery is essentially passive when it wages war. It cannot go forth to seek out and engage its enemies; it must wait, patiently and often in vain, for its enemies to come to it.

The accomplishments of the arm are therefore most often to be found rather in that which it prevented from happening, than in that which it caused to happen. In such an atmosphere, opportunities for distinction are rare. Only when things have gone terribly wrong, when the situation is *in extremis,* have antiaircraft artillery units ever found themselves in a position to distinguish themselves through unusual valor. Probably the best example of such a situation was the sacrifice of the 60th Coast Artillery (A.A.) on Corregidor Island in the campaign of 1941-1942 in the Philippine Islands. Those gallant men earned more than a dozen Distinguished Service Crosses, a host of Silver Star Medals and lesser decorations, three Presidential Unit Citations, and the admiration of a nation. In the process they shot down more than fifty Japanese aircraft. Unfortunately, however, that heroic episode was incident to a lost campaign, and the 60th C.A. would most probably never have had the opportunity to establish such a dramatic combat record if the efforts of the rest of the army had been graced with success.

The wartime service of most antiaircraft artillery units has therefore been at once less dramatic and less the stuff of which sagas are made. Such was the milieu of the Antiaircraft Service of the American Expeditionary Force in France in World War I. The A.A. Service undertook to prevent harm from coming to American troops and American installations as a result of German aerial operations. It was enormously successful in that task, although its combat record was brief and provided few heroes for veneration. In an age which virtually worshipped its aces, the A.A. Service did more valuable, if unspectacular work, than all of the aces put together. Aces were really irrelevant in a war in which air supremacy was simply not attainable; their only real function was that of maintaining morale. To the end of the war, the German Air Force provided active opposition to the Allies. Where friendly air protection was not complete—and that was virtually everywhere on the Western Front—a good A.A. defense was critically important.The American A.A. Service provided such a defense, and it is with that Service that the history of the American Air Defense Artillery as a functional arm really began. The first goal of this research was thus to begin a serious study of the history of the American Antiaircraft Artillery arm of service.

A second object of the study is to indicate the directions which the Army has taken in the growth of its doctrine for air defense. The usual conclusion with respect to the relationship between doctrine and technology is that doctrine must change in consonance with advances in the technical sphere. One might expect that antiaircraft artillery doctrine, inasmuch as it evolved from a series of technical developments in engineering and gunnery, would be the best example of doctrine varying with technical advances. That is not the case.

In fact, there is curiously little real difference between the doctrine evolved by the Antiaircraft Service of the American Expeditionary Force in 1917-1918 and the doctrine employed by the Air Defense Artillery today. All of the basic decisions arrived at during the First World War have survived the test of time and remain the accepted way in which air defense artillery units ought to be used. For example, the innovative gunners of 1917 and 1918 stated a mission for antiaircraft artillery which is little changed; the proper task of air defense, then and now, is to deny the enemy aircraft the use of friendly airspace. Present doctrine echoes the conclusion reached by the commander of the A.A. Service in World War I that shooting down aircraft is in that context only a "fortunate incident." Lesser elements of air defense doctrine also found their first statement in the World War, and how that came about forms an important part of the story of the A.A. Service. Allied to that subject is the question of how a new branch of service is formed. The first such case of the creation of a new combat arm occurred in 1917-1918, and the problems encountered by the men who had that task are instructive even now.

Finally, there is the matter of recognizing the real threat. No one today questions the importance of air power, or doubts that it played a crucial role in the wars of the twentieth century. Indeed, in retrospect, with the advantage of historical hindsight, the lesson is a clear one. But to the soldier of 1917, at the very beginnings of the age of military aviation, the importance of the airplane was not nearly so apparent—the world had not yet experienced wartime Coventry, London, Berlin, Dresden, Hamburg, Tokyo or Hiroshima. The final purpose of this study is to demonstrate that fact, and to illustrate by means of it the general conclusion that it is not a simple task to select from new technology those items in which military potential exists. It is correspondingly difficult, both in 1917 and now, to persuade the military establishment that the perceived threat is important, and that it must be met with a suitable technical response. This study can demonstrate the problems in handling new wrinkles in technology properly.

Therefore the story of American air defense begins, as it properly should, in the years before World War I, when decisions such as those were being made about machines that could fly. The prelude to the birth of the Army's antiaircraft arm encompassed the lengthy pause between the invention of the airplane and the recognition of any military use for it. The connection between airplanes and warfare was not, it seems, an obvious one.

[1] The story is told by Mr. William E. Barrett, one of the most knowledgeable students of the 1914-1918 air war in the United States, and has been repeated elsewhere, although without specific documentation. On balance, the explanation is a likely one.

[2] The U.S. Army Air Force lost 8,324 planes to enemy aircraft in all theatres of World War II, while losing a total of 8,858 to

enemy antiaircraft fire. In the critical European theatre, 8th Air Force lost 5,380 to A.A. fire, as against 4,274 to fighters. A total of 5,747 airplanes was lost to "other" causes in all theatres, a rubric under which such causes as mechanical failure are contained. Information contained in A.A.F. Statistical Digest, December 1945, as cited in *Air Defense. An Historical Analysis* (Fort Bliss, Texas: USAADS, June 1965), Vol. IV, p. 9.

CHAPTER 1

DEFINING THE AERIAL HAZARD

"It [the aeroplane] will be a factor in war."

—Wilbur Wright, in an interview at
St. Louis in 1906

"The airship will revolutionize warfare."

—Alexander Graham Bell
Letter of 1909

"That's good sport, but for the Army the airplane is of no use."

—Ferdinand Foch, remark at the
1910 Circuit de l'Est

The ground-bound, horse-minded frontier constabulary which had latterly passed for the field army of the United States had few airplanes, little experience with them, and no means whatever of combatting them. Although Americans had invented the airplane, they had pretty much ignored it in their military organization. In 1917, however, the airplane ruled the skies of Europe and, after years of neglect, something had to be done to protect American soldiers then outfitting for foreign service from the dangers posed by war planes. As American troops sailed for the European war in 1917, their leaders began to make the attempt to repair that deficiency as they were at last obliged to deal with the airplane and all of the other technological advances which had exercised the collective ingenuity of European general staffs since 1914.

That is not to say that the matter of air defense had received no consideration at all. The Congress itself took official notice of the airplane shortly before the war. The Honorable James Hay, Chairman of the House Committee on Military Affairs, raised the issue of defense against airplanes in August 1913. His principal witness in hearings on an "Act to Increase the Efficiency in the Aviation Service" was Brig. Gen. George P. Scriven, Chief Signal Officer of the Army. In the course of his testimony,Gen. Scriven had a moment of remarkable prescience in which he described to a doubtless awed committee fantastic circumstances in which an enemy fleet, anchored beyond the range of the guns of American coastal fortifications, could send airplanes to drop quantities of nitrogelatin on sensitive targets. He chose the example of the Gatun Dam, the destruction of which would be assured by no more than four-hundred well-placed pounds of explosive, with the effect that the Panama Canal would be closed. Gen. Scriven considered that "nobody would expect to see the aeroplanes again, but the probability is that some of them would be effective." He vaguely proposed the use of airplanes and dirigibles to meet such forays. Congressman Hay then raised the salient point:

> The Chairman.
> Has the Ordnance Department succeeded in getting a gun that could be used on aeroplanes?
>
> Gen. Scriven.
> The Krupp gun can do it. The Krupps have a gun that can be used against machines. The Ordnance Department has been experimenting, but I do not know that they have yet devised a gun.[1]

With that, the brooding Mr. Hay had to be content, and there, for a time, the matter rested.

Forward-looking Army Officers perceived the intellectual problems posed by military applications of the airplane, although not all were in agreement about the subject. They observed the growth of military aviation with keen interest and drew the logical inferences. Capt. John D. Taylor of the 14th Infantry pointed out in 1909 that the airplane could easily assume the role of cavalry in penetrating the fog of war to "locate the heads of the marching columns of the enemy."[2] His suggestion was, however, met with disdain by a considerable portion of the Army, led in the first instance by the Cavalry. The editors of *Cavalry Journal* rejected Taylor's notions when they replied that "we think that this article did not deserve serious consideration," and opined that the idea was so silly that it should "have barred it from the pages of a journal of another branch. . . ."[3] The prestigious and influential *Journal of the United States Artillery* was somewhat more open-minded about airplanes, and welcomed articles about them. Accordingly, that journal became the forum of the men who were concerned about the aerial threat.[4] In it they read about the development of airplanes and lighter-than-air craft abroad, and by means of extracts reproduced from the domestic and foreign press, kept track of evolving ideas about the use of "aerostats," as they called all flying machines. The bulk of the journal concerned itself with the uttermost refinement of coastal gunnery, as one might expect, but the editors devoted a substantial amount of space to what appeared at the time to be a marginal military problem. Articles dealing with aviation appeared with increasing frequency as war loomed in Europe.

The chief topic of discussion involved the discovery of the valid military applications of aircraft. Authors argued that the dirigible was the more significant vehicle because of its greater range, speed, stability, endurance, and load-carrying ability. Indeed, Maj. H. L. Hawthorne wrote in 1909 that the airplane, in "its present state of development is far behind that of its competitor [the dirigible] both as to sustained flight and rapidity of movement."[5] The conviction that the rigid airship was the aerial vehicle which merited military consideration was logical, reasonable, and, as the World War eventually demonstrated, completely wrong. But to the gunner of 1909, the dirigible seemed the most useful aircraft, while the airplane, a poor and fragile thing, could hardly lift its pilot, much less a useful military load.

Airships and airplanes in general, as the journal articles concluded, had diverse uses. Aircraft might be used primarily for scouting, but also as couriers and for transport. Use of aircraft as weapons of destruction did not cause much concern, although a number of articles discussed the techniques of the "throwing of bombs" in terms of the ballistic considerations involved.[6]Authors contributing to the journal dismissed aerial bombing as an immediate problem because of the insignificant load-carrying capacity of the aircraft of the day, but at least one article sounded a note of caution. Lt. F. W. Humphreys, writing in 1910, opined:

> As the United States was the only first-class power which signed the Hague agreement as to dropping projectiles from balloons, it is not probable that this agreement will be in force in future wars.[7]

Lt. Humphreys was, of course, more interested in the subject than most officers and probably thought about aircraft much more deeply; he was one of the first two military aviators qualified by Orville Wright in October 1909. Nonetheless, his was an ominous prophecy, destined for a grim realization.

Artillery officers turned their imaginations to means of dealing with airships. Many articles discussed the type of gun needed to shoot down balloons of all types, and resolved many of the ballistic problems involved. The inability of airships to maneuver rapidly and with agility, despite their speed, made tracking less of a problem than it would be with airplanes, and in 1913 the Ordnance Department decreed that the Army needed no new gun for the purpose. The Department ordered that the carriages of field pieces be modified to allow higher gun elevations, so that field batteries could absorb the anti-dirigible mission with no further special equipment.[8] Large calibre guns had been found necessary in order to burst the fabric of airship skins, thus allowing air and hydrogen to mix and set up the conditions essential to combustion. Experiments with rifle-calibre weapons had already shown that the fabric had a tendency to reseal when the puncture was small. The artillery shell's explosion also ignited the gas mixture, and the standard high explosive projectile was thought adequate for that purpose.[9] Existing field guns satisfactorily met all of the demands peculiar to the task of shooting down dirigibles.

Prudent officers, acknowledging the primacy of the airship threat and still regarding airplanes as unreliable contraptions, nonetheless began considering how to deal with them, too. Obviously, the field guns which the Ordnance Department regarded as sufficient defense against airships were inadequate against the swifter airplane. Maj. Hawthorne, after conceding the advantages that lay with airships, did warn his readers that

> The aeroplane, as an object of unfriendly opposition may offer even more of a problem to the artillerist in war than its more cumbersome brother, the dirigible balloon.[10]

He outlined the specifications for a good antiaircraft gun which could be used against either type of target when he wrote that it had to have a high muzzle velocity in order to decrease the time of flight of the shell to a moving aircraft. The carriage had to be stable, capable of all-around traverse and elevation to at least 70 degrees. He desired rapid and easy gun-laying in azimuth and elevation, as well as automatic loading and shell-case extraction.[11] An earlier article stressed the need for a large-calibre shrapnel shell and precise range-finding equipment. When the target had the ability to change position in three dimensions at a rate of 60 to 80 feet per second, gunners had to have more sophisticated tracking gear than currently existed. The editors summarized their position with another bit of prophecy when they asked their readers to "let us state our conviction that an aeroplane in motion will be an extremely difficult object to hit."[12] By the time of the World War, 1st Lt. Samuel H. McLeary, agreeing with them, reached the further conclusion that "we must look to a *new type* of high-angle-fire weapon . . . ."[13]

Inevitably, the discussion within the Artillery community had been entirely theoretical, unaccompanied by construction of guns or fire control equipment and corresponding experimentation. The Coast Artillery Corps did not build or procure guns; that was the business of the Ordnance Department. Ordnance, furthermore, was satisfied that it had dealt suitably with the problem of firing on aerostats. It did not begin development of a real antiaircraft gun until 1915 when the 3-inch gun project belatedly got under way. Thus, despite growing interest in the problem of air power and the continuing discussions of what might be achieved by means of it, the airplane still seemed too frail to be taken very seriously. And so the business of defending against it was set aside. The Army had, after all, solved the more serious problem of defense against airships.

The Root reforms of 1903 began a series of practical steps which eventually transformed the Army into a force which was fit for a European war, but the new force was developed in the laboratory of the Punitive Expedition into Mexico in 1916.[14] Some things went well; some did not. From the point of view of the aspiring aviators of the Army, the disappointing performance of the eight aircraft of the 1st Aero Squadron was counter productive. The squadron commander was Capt. Benjamin D. Foulois, who was later to head the Air Service in World War I. He reported that only two of his Curtiss JN-2 airplanes remained intact after only one month's operations, and they would not fly. Brig. Gen. John J. Pershing, the commander of the expedition, praised Foulois and his men but deplored equipment which allowed only occasional sky ventures. Unreliable machines dashed the high hopes cherished by Pershing for airplanes—that they would be useful for scouting and communications in the campaign. He found them to be unreliable as couriers and unsatisfactory as scouts. The conclusion to be drawn was that the business of simply flying in a campaign was perilous enough, without even considering the hazards of contact with an armed enemy force. If, therefore, the campaign in Mexico did little to forward the cause of the Air Service, it did even less to convince anyone that any sort of antiaircraft arm was needed.[15]

The negative opinion of the airplane held by many of the Army's senior officers was reinforced, and the consequence was that no one saw any need to find a means of combatting the airplane from the ground either. Considering the airplane to be a "military toy," the Army deemed it unnecessary to expend its limited resources on the development of antiaircraft artillery. Despite reports of the European experience at war which were even then filtering in, the basis of solid experience from the Punitive Expedition indicated that airplanes had a sufficient tendency to fall unaided out of the sky. There, again, the matter rested.

By the summer of 1917, an entirely different situation prevailed. While the "knights of the sky," the von Richthofens, the Nungessers, the Bishops, and the Balls, provided useful propaganda and diversion, some airmen turned their minds to practical ways in which airplanes could really affect the course of the war. The rigid airship had been revealed as far less a cause for worry than had been imagined before the war. The bomber, a speedy and powerful product of the technological society, had arrived as a serious weapon. The stately and elegant airship had gone with the Edwardian Age which the war had wrecked. Gone too were the days when intrepid birdmen piloting fledgling aircraft risked life and limb to shower troops on the ground with hand grenades and flechettes. In 1917 Gotha bombers terrorized London and such aircraft as the A.E.G. G-4 bomber attacked the rear areas of the British and French trench lines with considerable effect. Observation aircraft of all types made precise artillery fire possible and the secret concentration of troops almost impossible. Airpower had arrived as an integral part of the machinery of war. The U.S. War Department saw the dangers as clearly as anyone else and took steps to provide against them.

When American involvement in Europe became certain, Secretary of War Newton D. Baker realized that the Army had insufficient information upon which to base the organization of its expeditionary forces. He sent a board of officers under the direction of Col. Chauncey B. Baker, Q.M.C., to observe the

Allies and prepare a report on the nature of war and render recommendations on the proper structure and operations of American forces to be employed in France.[16] The commander-designate of the expeditionary forces, Maj. Gen. John J. Pershing, managed to conceal his delight at the prospect of a board which could in the end foist upon him the entire war plan of the A. E. F. He set about influencing Baker's work. Happily enough, Pershing and Baker, both members of the Military Academy Class of 1886, saw eye to eye and Pershing was later able to write that Baker, "acting upon my suggesting, very wisely concluded to work in conjunction with the Operations Section of my staff . . . ."[17] Baker's cooperation in ordering his officers to help Pershing's staff frame the General Organization Project of the A. E. F. prevented discord at the very start of the existence of the expeditionary forces. His report, submitted after the officers had spent six weeks touring the fronts of the Allies,[18] concluded among other things that air power had an important role in modern warfare and posed a considerable threat to troops on the ground. Baker therefore recommended the establishment of a training school for officers of antiaircraft artillery in the United States and a school for both officers and noncommissioned officers in France. A further recommendation considered a training camp for newly organized antiaircraft units in France advisable.[19] Col. Baker's recommendations were, as a result of his understanding with Gen. Pershing, judiciously blended into the General Organization Project of the A. E. F. In its response to the aerial threat, the plan called for a comprehensive system of antiaircraft defenses which were to include one 3-inch antiaircraft gun battalion and one antiaircraft machine gun battalion per corps, while allocating twenty platoons of antiaircraft guns to each army.[20]

It was all very well to plan an extensive Antiaircraft Artillery Service, but the American Army had hardly the troops to man a respectable number of Infantry Divisions, and conscription could not find the highly trained gunners required for the antiaircraft artillery arm. Furthermore, shortages existed in every kind of equipment and weapon. The 3-inch gun called for by the General Organization Project of the A. E. F. was not available because its development had been begun so late. Presumably, Ordnance had modified any number of field gun carriages for high-angle fire by then, but such simplistic contrivances would not answer the needs of the day. The problems with which the War Department had to deal, then, were simple to state but rather more complex to solve. Where were the men for assignment to Antiaircraft Artillery to be had? What sorts of weapons were they to be given, and from what source were those weapons to come? Where would the men learn the gunnery techniques which had until then been unknown in the American Army?

The last two of those questions were ultimately answered by default. The new antiaircraft artillery service would, like all of the other units of the Army which required any sort of heavy or sophisticated equipment, have to rely upon the generosity of the French Army. The A. E. F. entered World War I with no antiaircraft artillery whatever. That was hardly surprising, considering the general shortage of artillery of every type in the pre-war Army. The 3-inch Antiaircraft Gun M1917 was in 1917 only an Ordnance Department prototype which would be unavailable in any quantity for many long months to come. Just as the Allies supplied the A. E. F. with its field artillery and heavy artillery, so also did the Army in France have to turn to the French for its antiaircraft guns.[21]

It was but a short step from the reliance on French weapons to the assumption that French antiaircraft gunnery techniques would also be used. The technical surprise of the use of airplanes for purposes of warfare had by 1917 found an increasingly effective technical counterpoise. Airmen who had been accustomed to joke about fire from the ground were in that year obliged to admit the lethality of steadily improving antiaircraft fire. Nonetheless, antiaircraft gunnery remained, at best, an inexact science which was tinged as much with arcane art as with absolute skill. The technology of accurate fire direction was being developed slowly and painfully, and the dominant method of attacking aircraft consisted basically of filling the sky with as many flying bits of metal as possible. With luck the enemy might fly into them. The American gunners lacked even that rudimentary experience, and however unreliable French fire control technicians might be, it was surely desirable to master them before moving on to better things.

Guns and gunnery decided upon, the only problem which remained was to find the manpower for the proposed antiaircraft units. The British Grand Fleet, oddly enough, made possible the organization of the new American Antiaircraft arm. Because it had the Imperial German Fleet securely blockaded in home ports, there was a very low order of probability that German warships might appear off Sandy Hook or other points on the American Atlantic coast to punish Germany's new enemy. Accordingly, the Army was secure in its decision to assign its highly trained Coast Artillery gunners to the heavy artillery, trench mortar, and antiaircraft artillery units of the Expeditionary Force.[22]

Maj. Gen. Erasmus M. Weaver, the Chief of Coast Artillery, agreed that only his long-service gunners possessed the requisite skills and experience in firing at any sort of moving target and concurred in the War Department decision to send them to France.[23] Because the Coast Artillery Corps had, over the course of many years, evolved reasonably sophisticated means for firing at targets moving in two dimensions, its gunners were the appropriate choices to man units which had to fire on targets which could maneuver in three dimensions. Their training formed a congenial base of experience upon which the more delicate methods of antiaircraft gunnery could be laid.[24] Coincidentally, the choice also meant that the eventual Antiaircraft Service of the A. E. F. was to be directed by Regular Army Coast Artillery Corps Officers.

Gen. Pershing's expeditionary force still did not have the extensive organization of antiaircraft services called for by its General Organization Project, but by the summer of 1917 the situation was at least much improved. The War Department had made the fundamental decisions as to how such a service was to be founded. It had found the men—men who were already skilled in a demanding craft. As for guns and training, the War Department had already admitted that it could not give that which it did not have, and was prepared to go, hat in hand, to the French for help. As the first of the Coast Artillery gunners began to embark the ships which were to carry them to war, the Army had done all that it could do in the United States toward turning them into an Antiaircraft Service. The task of transforming plans and intentions into reality lay with the officers and men in France.

ENDNOTES

[1] The text of the hearing is reproduced in Maurer Maurer (ed.), *The U.S. Air Service in World War I* (Washington:The Office of Air Force History, 4 volumes, 1978-1979). See Vol. II, *Early Concepts of Military Aviation,* p. 5.

[2] Capt. John D. Taylor, 14th Infantry, "Cavalry and the Aeroplane," in *Journal of the United States Infantry Association,* Vol. 6 (July 1909), p. 84.

[3] "Editors Table," *U. S. Cavalry Journal,* Vol. 20 (November 1909), p. 617.

[4] No other journal dealt seriously with the problem of *defense against aircraft,* although some did envision future *uses for* aircraft.

[5] Maj. H. L. Hawthorne, C.A.C., "Balloons and Dirigibles in War," in *Journal of the United States Artillery,* Vol. 32 No. 2 (September-October 1909), pp. 107-115.

[6] Articles in *Journal of the United States Artillery* which addressed the functions of aircraft included:"Is the Aeroplane Practicable For Scouting," Vol. 30 No. 2 (September-October 1908), pp. 205-206; Capt. S. F. Bottoms, C.A.C., "A Possible Use For Aeroplanes In War Suggested By Witnessing Their Flights At Los Angeles," Vol. 33 No. 2 (March-April 1910), pp. 122-124; Lt. F. E. Humphreys, C.E., "The Wright Flyer and Its Possible Uses In War," Vol. 33 No. 2 (March-April 1910), pp. 144-147; "The Command of the Air and Its Effect On Land Warfare," Vol. 33 No. 1 (January-February 1910), pp. 92-94; "Air-craft For The Army," Vol. 34 No. 3 (November-December 1910), pp. 321-322;

"Bombs for Aeroplanes," Vol. 42 No. 3 (November-December 1914), pp. 376-377, which announced successful Ordnance Department experiments at San Diego; and 1st Lt. Samuel H. McLeary, C.A.C., "The Aeroplane In Coast Defense," Vol. 43 No. 3 (May-June 1915), pp. 283-330.

[7] Humphreys, "The Wright Flyer and Its Possible Uses in War," *op. cit.* "A Declaration Prohibiting the Discharge of Projectiles and Explosives from Balloons," signed at the Hague on 18 October 1907, was valid only when two or more *ratifying* powers were at war with each other. See [War Department: Office of the Chief of Staff] *Rules of Land Warfare* (Washington: USGPO, 1914), pp. 181-183.

[8] Announced in "Defense Against Aeroplanes in U.S.," in *Journal of the United States Artillery,* Vol. 40 No. 3 (November-December 1913), pp. 254-255.

[9] See various articles in *Journal of the United States Artillery:* 1st Lt. Walter E. Prosser, 3rd F.A., "A Discussion of the War Balloon and Similar Craft, And the Best Methods of Attack By Artillery," Vol. 34 No. 3 (November-December 1910), pp. 257-262; "Airship Guns," Vol. 33 No. 2 (March-April 1910), pp. 168-173, which discussed the relatively advanced Krupp 6.5-cm, 7.5-cm, and 10.5-cm balloon-guns and the Ehrhardt 5-cm. balloon-gun; Col. J. E. Capper, C.B., R.E., "The Military Aspect of Dirigible Balloons and Aeroplanes," Vol. 33 No. 2 (March-April 1910), pp. 147-168; "Construction of Guns for Use Against Airships," Vol. 32 No. 3 (November-December 1909), pp. 303-310; and Hawthorne, "Balloons and Dirigibles in War," *op. cit.*

[10] Hawthorne, "Balloons and Dirigibles in War," *op. cit.*

[11] *Ibid.*

[12] "Is the Aeroplane Practicable For Scouting," *op. cit.* The impact of the Journal was not inconsiderable. See Col. William Cooper Foote, "The Antiaircraft Artillery Journal and its Influence on the Development of the Coast Artillery Corps of the United States Army" (Washington, typescript, May 1953), in the Foote Papers, MHRC, Carlisle Barracks. The *Journal of The*

United States Artillery ran from January 1892 to July 1922, when it was renamed *Coast Artillery Journal.* With the September-October issue of 1948, it became the *Antiaircraft Artillery Journal.* In 1950 the publication was absorbed into the *U.S. Army Combat Forces Journal.*

[13] McLeary, "The Aeroplane in Coast Defense," *op. cit.*

[14] The best book for an introduction to the issue of Army reform is Russell F. Weigley, *History of the United States Army* (New York: The Macmillan Company, 1967). The standard study of Pershing also considers the issue of preparedness in 1916. See Frank E. Vandiver, *Black Jack. The Life and Times of John J. Pershing* (College Station: Texas A & M University Press, 2 Vols., 1977). See Vol. I, Ch. 17, for his discussion of the Punitive Expedition. A work focused on the Mexican Expedition is Haldeen Braddy, *Pershing's Mission in Mexico* (El Paso: Texas Western Press, 1966), p. 64 *et seq.*

[15] See the "Report of Operations of the First Aero Squadron, Signal Corps, with Punitive Expedition, U.S.A., for Period March 15 to August 15, 1916," by Capt B. Foulois, reproduced in Vol. II, Ch. 13, *The U.S. Air Service in World War I.* Also see Vandiver, *Pershing,* Vol. I, pp. 614, 624, 631, and 660, for various comments on the value of aircraft.

[16] UNITED STATES ARMY IN THE WORLD WAR, 1917-1919. *Reports of Commander-in-Chief, A. E. F., Staff Sections and Services* (Washington: U. S. Government Printing Office, 1948). Vol I, pp. 55-89. The Baker Mission was dispatched to Europe on 28 May 1917. This series of documents is hereinafter cited as AEF-OR. Col. Baker was unrelated to the Secretary of War.

[17] See John J. Pershing, *My Experiences in the World War* (New York: Frederick A. Stokes, Company, 2 Vols., 1931), Vol I, pp. 100-101. For a discussion of the potential conflict, see Vandiver, *Pershing,* Vol. II, pp. 715-737.

[18] The members of Baker's board were Colonels W. S. Graves, C. P. Summerall, D. E. Aultman, M. L. Hersey; Lt.

Colonels H. E. Ely, E. D.Anderson, K. Walker, and S. A. Cheney; Majors M. E. Locke, G. S. Simonds, and F. A. Ellison; and Capt. J. G. Queckmeyer. The officers of Pershing's Operations Section were Lt. Colonels John McA. Palmer and Fox Conner and Majors A. B. Barber and H. A. Drum.

[19] Report of the Baker Mission, in AEF-OR, Vol. I, pp. 69-70.

[20] *Ibid.,* pp. 91, 99-101. The Report was dated 10 July 1917. Also, Lt. Col. Richard W. Owen, Origins of Antiaircraft Artillery," in *Antiaircraft Journal,* Vol. 43, No. 1 (January-February 1950), pp. 37-39.

[21] The Army's modern artillery was limited to a negligible quantity of 3-inch field guns, many of which were then in the Philippines. Gen. Pershing's staff estimated that the Army in France would need 2,524 guns immediately; the Ordnance Department could deliver no more than 120 by October 1917, and none after that until June 1918. See Pershing, *Experiences,* Vol. I, pp 106-107. The procurement of all types of artillery was a continuing concern for the C-in-C, and he never relaxed his efforts to spur the production of more and better artillery. The only American-built guns to see action were 8-inch howitzers of British design built for the 58th Artillery. See *History of the 58th U.S. Artillery, C. A. C.* (New York: Wyncoop Hallenbeck Crawford Co., n.d.), p. 21. C.F. Col. Leonard P. Ayres, *The War With Germany. A Statistical Summary* (Washington: USGPO, 1919), Ch VI, "Two Thousand Guns on the Firing Line," pp. 73-84. Col. Johnson Hagood, commanding a regiment of heavy artillery, was told in June 1917 by officers of the Ordnance Department that the shortage of guns resulted in part from the unwillingness of the Chief of Coast Artillery to withdraw guns from the coastal forts for shipment to France. See Hagood's Diary, Vol. I, entry for 19 July 1917, in Hagood Papers, USAMHRI, Carlisle Barracks. It may be supposed that the proposal to remount small calibre coastal guns as antiaircraft weapons foundered on similar objections.

[22] See the discussion in *Order of Battle of the United States Land Forces in the World War. Zone of the Interior.* (Washington:

USGPO, 1949), Vol. III, Part I., p 145 (hereinafter cited as *Order of Battle*). It is also pertinent to recall that the Imperial German High Seas Fleet was built with European operations in mind, and was relatively short-ranged.

[23] *Viz.* his comments in "Report of the Chief of Coast Artillery," *Annual Report, 1917,* p. 929, and "Report of the Chief of Coast Artillery," *Annual Report, 1918,* p. 1263, as cited in Larry H. Addington papers in the Coast Artillery Corps Papers, MHRC, Carlisle Barracks.

[24] The matter is aptly summarized in a semi-official pamphlet published under the aegis of the *Infantry Journal, The Coast Artillery Corps of the United States Army* (Chicago: Rand McNally & Co., 1943), p. 64, which explains that "The Coast Artillery Corps was the only branch of our Army with experience in firing anything larger than a rifle at moving targets, so it was given the important job of countering the airplane with artillery fire from the ground."

CHAPTER II

ORGANIZATION OF THE ANTIAIRCRAFT SERVICE

> "The power of an air force is terrific when there is nothing to oppose it."
>
> —Winston Churchill,
> *The Gathering Storm,* 1948

The nucleus of the Army's first Antiaircraft Artillery Service left the United States on 26 July 1917, en route to France with the first of the combat troops. The contingent was in all conscience small enough, although it consisted of a well-balanced mixture of experienced maturity and youthful vigor. In fact it consisted of just three officers. Maturity was provided by Brig. Gen. James A. Shipton, N.A., a mustachioed and genial veteran of twenty-five years of Coast Artillery service. A capable commander and staff officer, he was also a veteran of combat duty. In his first years of commissioned service, Shipton served as an officer of Volunteer Infantry in the war with Spain, commanding troops in six engagements in Southern Luzon. In the intervening years he held virtually every assignment a Coast Artillery officer might expect, including company and fort command. A graduate of the War College, Shipton had also experienced the problems of dealing with foreign armies while assigned as Military Attaché in Brazil.[1] Gen. Shipton and his small party arrived in Europe with orders to "investigate the subject of antiaircraft defense as developed by the British and French at schools and at the Front."[2] Very shortly he found himself directed to found and command the Antiaircraft and Trench Mortar School of the

A.E.F., a double duty which left him little time for direct supervision of the development of the Army's antiaircraft defense until the two schools were eventually separated.

The remaining two officers of Shipton's party provided the youthful vigor required to found a new branch of the Service. Gen. Shipton, enmeshed in the larger matters of coordination with the G.H.Q. and negotiations with the French for resources and training areas, divided his time between those duties and the problems of running the training center. By default, the two young men who arrived in France with him were effectively in full control of the day-to-day business of getting the Antiaircraft Service going. To an extent, the combination of experience and youth was no accident; General Pershing, ever economical with his relatively few professional officers, pursued a policy of assigning jobs of great responsibility to junior Regulars. If they succeeded, they were eventually promoted to temporary ranks commensurate with the jobs they held. The system worked well; where it succeeded, and it usually did, young men accomplished tasks far beyond any that their substantive ranks would call for and gained a depth and breadth of experience which provided the Army with the intense professionalism at all levels of command and staff which was the hallmark of the next two decades. Where it failed, the man was simply reassigned to less demanding duty, or different duty, in which his particular talents could be used most effectively.

It was just such a situation in which Captains Glenn Preston Anderson and George F. Humbert found themselves. Anderson was only three years out of West Point; the twenty-six year old Virginian's Captain's bars were sparkling new, thrust at him after minimal experience in the Coast Artillery Corps. Humbert was a thirty-one year old Naval Academy graduate with almost six years of Coast Artillery duty. Although he was the senior of the two men in point of rank, his promotion was really little earlier than Anderson's, both men having been advanced in the rapid expansion of the National Army during the course of the summer.[3] Gen. Shipton promptly handed

Anderson and Humbert the type of order professional officers claim to prefer but more often dread. They were told, with little preamble and with less elaboration, to organize the antiaircraft defenses of the A.E.F. They were then left to figure the rest out for themselves.

Time was pressing and decisions had to be made, even in advance of firm information about the Army's specific requirements for Antiaircraft Defense or the techniques and equipment which would be available. The first battalions and separate batteries of troops were due to arrive from the United States by late fall, and some provisions had to be made to command, billet, ration, and train them. Humbert and Anderson hastily sketched out a general plan for training, equipping, and employing the new units, and assisted General Shipton in drawing up the Table of Organization for the Headquarters of the A.A. Service which was to command them. As such things go, the Headquarters was a spartan organization, rigidly kept to its minimum necessary size. Only twelve officers and twenty-nine other ranks manned its seven staff sections. They were not overburdened with equipment, inasmuch as they were authorized only two automobiles and twenty-seven pistols.[4] The commanding general was assisted by an aide-de-camp and a Chief of Staff, to whom the various sections reported. The Artillery Section, concerned with the procurement and use of A.A. artillery, was the only staff element which required a Coast Artillery Corps officer. The Machine Gun Section was directed by an infantryman, and the Searchlight Section was supervised by an engineer. Other sections were staffed largely by coast artillerymen, but that had more to do with the availability of officers by branch than with requirements. The composition of the headquarters, being made up of officers of several branches, presaged the composite nature of the A.A. Service it was to command.

In the beginning, of course, most of the sections were still only projected, and the entire staff was provided by Anderson and Humbert, who were frequently absent from the Headquarters at Langres. The two officers undertook a series of tours to learn how America's new allies went about defending against aircraft, traveling extensively in England, along the British and French fronts, and to the French Antiaircraft School at Arnouville-les-Gonesse.[5] In the end, they decided that the best course was to continue with the plans phrased by the War Department for training at the hands of the French. The French School was immediately at hand, the French had agreed to provide weapons and equipment, and French gunners appeared to have evolved the most successful techniques for shooting at aircraft. Anderson made arrangements with the French to teach their methods to a class of twenty-five Coast Artillery Corps officers, the first officers to be assigned to the A.A. Service. The officers of the first class were fresh from Fort Monroe. They learned on arrival at St. Nazaire that twenty-five technically trained Coast Artillery officers were to study antiaircraft artillery. Since there were exactly twenty-five of them there at the time, all were elected. Within a month, Anderson and Humbert had established themselves in the Chateau d'Arnouville, a spacious old structure at Arnouville-les-Gonesse, Seine-et-Oise, on the grounds of the French Antiaircraft Artillery School. There they founded the officers' school for A.A. Service. The first course of instruction began there on September 26.[6] That class of officers was not destined to go to the front, however, or at least not immediately. They were to become the cadre of the American Antiaircraft Service, taking over the instruction of new classes of officers and new units of troops as they arrived in Europe. The course was given by Capt. Charles Rollet and Capt. Paul Gassier of the French Antiaircraft Artillery Service. Under their tutelage, the twenty-five officers underwent a course of four weeks duration, during which they learned French firing instructions and drill regulations for semi-fixed and auto-mount guns then in service. The students struggled with the course at first, trying to get from Capt. Gassier's "quaint" English what it was all about. Gassier wrote swiftly on his chalkboard, erasing equations as quickly as he put them up. In addition, the students prepared translations of French artillery service regulations for use in subsequent instruction. Upon graduation, the student officers were assigned in pairs to French antiaircraft batteries for a further two weeks of study and practical experience. They were required to keep careful notes and then spent two more weeks at the Chateau d'Arnouville preparing notebooks to supplement the French firing and drill regulations they had learned.[7] Thus trained, those officers formed the cadre of the Antiaircraft Artillery Service. A small group, led by Capt. Anderson, remained as the faculty of the officers' school. The remainder became the staff of the A.A. Service and its ancillary supporting organizations. About the middle of October Capt. Humbert was reassigned to duties outside of the A.A. Service and was replaced by another officer who was eventually to command the Service. Maj. Jay P. Hopkins, C.A.C., who had until then commanded the 1st Battalion of the 7th Provisional Regiment, C.A.C. (Railway), arrived to take up the duties of Director of Troop Training at the A.A.A. School.[8]

With the structure of the A.A. Service settled and the staff of both the Headquarters and A.A.A. School trained in the latest French antiaircraft techniques, Gen. Shipton was by the end of October 1917 prepared to receive the various units which were to come under his command.[9] Having had virtually nothing to guide them except the experience of the French at second-hand, Captains Humbert and Anderson had made the first, tentative decisions which determined the future course of the American Antiaircraft arm. The men were on the way to France; the priorities for the staff now were training and the acquisition of equipment.

The Army Antiaircraft School eventually grew into a large operation which was capable of handling all types of training. In the beginning, however, the School was small, limited in its scope to the capabilities of its handful of French instructors and student officers. As the A.A. Service developed, the A.A.A. School underwent correlative diversification, but in November 1917 the emphasis was on the use of artillery fire to combat aircraft. While Capt. Anderson and the other officers of his class were at the front with French units, Maj. Jay Hopkins moved the school to Langres, situating it there with the remainder of the A.E.F. Army Schools System.[10]

The Artillery Section therefore began operations in Langres. The first course of instruction, a duplicate of the course the French gave at their own Ecole D.C.A., or A.A.A. School, had been so successful that Maj. Hopkins decided to adopt the French antiaircraft methods in their entirety. The six-week curriculum of the school thus paralleled the French course in all important respects and emphasized the technical and theoretical aspects of antiaircraft fire. There was a good reason for that. Since the aim of the school was to give the fullest and most complete course possible and make the American A.A. Service technologically independent of its allies, the instructors made the effort to study in detail all of the new developments in gunnery. In that regard the location of the section near the French school was a considerable advantage, since the French operated an experimental facility at the Ecole. The possibility of using British fire control methods was never seriously considered because the French had clearly assumed the lead in the business of firing at aircraft. The British school was technically inferior to that of the French, and in fact the British tended to distrust "technical shooting" and preferred to shoot by eye. Gen. Shipton had already decided in favor of the technological approach to the problem, and that meant the French approach.

The course taught at the American school covered the latest fire control methods in detail, but also taught all discarded methods of fire control which involved interesting or potentially useful principles. The officers who graduated from the school were thereby made more competent to instruct their men in the use of their equipment, since they were fully aware of all of the theories involved. The chief benefit to the Army, on the other hand, was that the school's graduates were also competent to help design new fire control equipment and to evaluate new and suggested instruments. In the interests of obtaining still broader technical expertise, groups of five officers were detailed to attend the British A.A.A. school at Steenwerck; in all, twenty Americans attended that school.[11] Periodically, American officers were also sent to be students at the French school. In both cases, the American A.A.A. School used the reports they submitted in evaluating and redesigning its curriculum.[12]

In a more practical vein the school also taught identification of targets, use of sound apparatus and firing by sound, selection of position, techniques of barrage fire, camouflage, and construction of bomb proofs and field fortifications, tactical use of artillery with searchlights, gas instruction, principles of fixed antiaircraft defense, and methods of liaison with the Air Service. The course included visits to aviation fields, gun emplacements, listening stations, and ordnance proving grounds, as well as the final one-week stay with a French unit on the line. Instruction in basic subjects was not neglected either. All students received a full ration of classes in close order drill, physical education, military courtesy, and first aid.

Despite the rigor of the training, the officers' course pursued a policy of instruction, rather than elimination. Each case of course failure was examined on its merits. Wherever an officer had sufficient native ability or technical training background to be capable of mastering the material, he was reexamined or received extra training. If, on the other hand, he remained deficient or simply lacked the ability or education to succeed in the A.A. Service, he was transferred to other duties which placed less of a premium on technological competence. Out of a total of 237 officers trained by the artillery section, thirty-six failed to achieve the required standards; fourteen of those men were eventually found to be unfit for duty in the Antiaircraft Artillery and were transferred elsewhere.

A fundamental principle of antiaircraft artillery training was that officers and enlisted men were to be trained separately. The officers' course required some technical background of its students, and was by far the more demanding of the two. As a matter of policy, officers were detached from their units and attended the officers' school. They were replaced in their batteries by other officers who were graduates of the first officers' course. Those instructor-officers were responsible for conducting a training programme for the enlisted men which included many of the same subjects taught to their officers. Upon completion of training, the student officers were briefly attached to

French (and later to American) batteries at the front for experience, while the enlisted men were sent as units to the front for their firing experience. At the end of the six-week training programme, officers and their units were reunited.[13]

From the outset, shortages in artillery equipment plagued the school. Maj. Hopkins finally arranged a loan from the French of two auto-cannon about the middle of December 1917. By that time, however, the first of the antiaircraft troops were arriving from the United States, and the two guns were insufficient to train so large a number of men. Battery A, 1st A.A. Battalion (CAC), and the 1st A.A. Battery arrived at Langres on 12 November. By 1 December, the other batteries of the 1st A.A. Battalion and the 2d, 3d, and 4th A.A. Batteries had arrived. Hopkins failed in all of his attempts to get more equipment for training and was finally forced to seek another solution. In the end, he decided to move the Artillery section back to Arnouville, where the men could have the use of the guns at the French A.A. School, as well as the guns mounted in the nearby forts for the antiaircraft defense of Paris.By 24 January 1918, therefore, troop training was being conducted at Fort de Stains, near Arnouville, and the officer's school had been reinstalled in the Chateau d'Arnouville.

Machine guns, in wide use as low altitude antiaircraft weapons by all of the warring powers, were also adopted by the American Army for that purpose. Machine gunnery was somewhat more complex than one might imagine, especially when directed against aircraft, however, and Gen. Shipton directed that a suitable school be founded as part of the A.A.A. School.[14] Major William Fitzhugh Lee Simpson, 64th Infantry, organized the resulting Machine Gun Section of the A.A.A. School at Langres on 2 December 1917. Simpson was a Regular who had plenty of wartime experience, having fought in the Morro Expeditions of 1906 and 1910-1912, as well as in the Punitive Expedition of 1916. He began work by gathering information about antiaircraft machine guns from the British and French and making preparation to receive the battalions he would have to train. But Simpson had hardly begun his work in France before he was stricken with appendicitis and died following the resultant operation on 17 January 1918.[15]

Simpson's replacement was Major Andrew Boggs Drum, a Regular officer of Marine Infantry who arrived in February 1918. Drum augmented the small training staff Simpson had collected with an experienced man of his own choosing: Gunnery Sergeant Earl A. Dickey, U.S.M.C., came to the Section from the Marine Corps' 6th Machine Gun Battalion. The Section remained a small one nonetheless, ultimately consisting only of the Director, Maj. Drum, a Senior Instructor, Capt. Leon F. Foss, two French commissioned instructors, nine American commissioned and six noncommissioned instructors, one clerk, and 45 enlisted men. The first of the French officers to arrive was the personable Lieut. Oliver MacConnel, posted from the 21st Chausseurs as a technical advisor.

Between February and May, when the first antiaircraft machine gun units arrived, Drum and his staff prepared themselves to conduct training. They studied the various methods of firing at airplanes with machine guns and drilled themselves to become proficient. The instructors mounted their guns for antiaircraft defense of Langres and manned them when the area was threatened by enemy aircraft, thus continuing an economy of force measure begun by the Artillery Section. Throughout the remainder of the war the air defenses of Langres and the Arnouville area were provided by the training cadre and units under instruction at those places. The choice of weapons lay between the Hotchkiss and St. Etienne guns, and the section conducted tests which in the end led to the selection of the Hotchkiss for antiaircraft work. The Hotchkiss was not only the more mechanically reliable gun, but it also could fire at all angles of elevation and was suitable for use with the French "infantry corrector" antiaircraft gunsight.

Table: Classes in Attendance at the Artillery Section, A.A.A. School

Class #	Inclusive Dates	Remarks
1	26 Sep.-22 Oct. 1917	25 Coast Artillery officers to form the cadre of the A.A.A. Service. Instructed by French officers.
2	4 Feb.-2 Mar. 1918	25 Coast Artillery officers and the 19 officers of the 1st A.A. Bn. and the 1st, 2d, 3d, and 4th A.A. Batteries. Instructed by American officers.
3	10 Jun.-16 Jul. 1918	27 officers from Coast Artillery and Field Artillery regiments in France.
4	1-30 Jul. 1918	Officers of the 2d A.A. Bn. and the 5th, 6th, 7th and 8th A.A. Batteries (total of 25 officers),
5	12 Aug.-14 Sep. 1918	24 officers of the 9th, 10th, 11th and 12th A.A. Batteries and from the Saumur Artillery School.
6	2 Sep.-5 Oct. 1918	16 officers of the 3d A.A. Bn. Training at the front conducted with American units.
7	9 Sep.-12 Oct. 1918	21 Field Artillery officers.
8	29 Oct.-24 Nov. 1918	27 Coast Artillery officers of the 4th and 5th A.A. Bns. Officers graduated and returned to U.S. for demobilization.
9	29 Oct.-24 Nov.	28 officers of the 6th A.A. Bn. and 13th-20th A.A. Batteries. Returned to U.S. for demobilization upon graduation.

On 12 May 1918 the French assigned a range known as the Courcelles-en-Montagne Antiaircraft Firing Ground to the school, and Maj. Drum moved the headquarters of the school from Galland Barracks in Langres to Montaubon, about eight kilometers distant from Langres but convenient to the range. There he and his staff received the 1st Antiaircraft Machine Gun Battalion on 19 May. The troops under instruction helped to prepare the firing range for use. Courcelles-en-Montagne was ideal for its purpose, having a ravine at each end of its 25-square kilometer area. Ground firing was conducted in the ravine against the hills. Aerial firing was conducted from the ravine into and over the terrain of the range proper. The first aerial targets to be used were balloons, but Maj. Drum quickly saw the need to provide a more challenging, moving target. He arranged to have an airplane-type target mounted on a motorcycle. Guns in the ravine then fired at a simulated low-flying aircraft while the motorcycle was driven at speed along a path on top of the steep banks of the ravine. The driver of the motorcycle was protected from the errant fusillades of student gunners by a low stone wall, behind which he drove his machine. A searchlight section was sent to the school once a week for a further refinement in training. Night firing was held every Thursday night, with the searchlight illuminating balloons released over the range. With that addition, the range was complete.

The section's programme of instruction was planned for the training of entire units. Officers and noncommissioned officers attended some special classes, but otherwise remained with their companies. The schedule included training in the metric system, maps, indirect fire, barrage fire, night firing, identification of airplanes, camouflage, and field fortifications. As in the other Army schools, students also received liberal doses of close order drill, first aid, military courtesy, physical training, signaling, and anti-gas precautions. The six-week course concentrated, of course, on the machine gun itself and on aerial firing exercises.

Between 27 May 1918 and 30 November 1918, the Machine Gun Section trained approximately 4500 troops of the

1st, 2d, 3d, 4th and 5th Antiaircraft Machine Gun Battalions and the 141st Machine Gun Battalion. Beyond the six-week course taught to the battalions, the school organized a special two-week course for officers and noncommissioned officers of artillery. Once trained, they were able to organize low altitude antiaircraft defenses of their regiments. About 125 officers and 350 NCOs were trained in that way. Finally, the school sent instructors to Is-sur-Tille to give the two-week course to the men of the antiaircraft artillery batteries and searchlight platoon which formed the defenses of the Regulating Station and associated activities at that place, and to Abainville in August to give similar training to the troops manning machine guns emplaced for the protection of the light railway shops there.

The Searchlight Section of the A.A.A. School was a late addition, not being established until 29 June 1918.[16] Before the war had progressed very far, all of the armies engaged realized that field seachlights could not survive within ranges to the front lines at which the lights could be of any real use. The only effective use of searchlights made during the war was in antiaircraft work, and Americans were among the principal users of searchlights in that field. Searchlights were manned by engineers in general service, and their training was such that engineers were naturally assimilated into the A.A. Service to man its lights as well.

There had been a detachment of searchlight engineers at Langres for over six months, until June 1918 functioning as a part of the Army Engineer School. When Gen. Shipton's staff realized the value of the lights in A.A. Service, searchlight training was assumed by the A.A.A. School, with facilities at the French Searchlight Depot at Fort Mount Valerien, at Langres, and at an advance base at Colombey-les-Belles. The decision to use searchlights most probably arose from observation of the British, who used them extensively. The French virtually ignored searchlights, preferring to locate aircraft at night by means of sound apparatus. The Americans, following the British example for once, used the listening equipment to direct the searchlight;

the lights then illuminated the targets, allowing direct fire by the guns.

Until American searchlights and generators arrived in France, the first searchlights troops assigned to the A.A. Service were sent to the British and French fronts to learn their craft and man the foreign equipment available there. Once the Searchlight Section was in operation, troops received six weeks of training at Langres, with special attention to the various types of searchlights, selection of positions for the lights, camouflage, listening apparatus, gasoline engines and power generators, telephones, and vehicle use and maintenance.[17] Once units completed their training at Langres, they were sent to the Advance Searchlight Base at Colombey-les-Belles to await delivery of equipment. While waiting, they filled in their time with searchlight drill, using the many aircraft operating from the flying grounds at Colombey-les-Belles as targets.

The Searchlight Section was directed throughout its existence by Lt. Col. John C. Gotwals, C.E., who also commanded the 56th Engineers (Searchlight). Acting Director in his absence was Capt. James O. Jensen, C.E., who conducted training with the aid of four officers and eight noncommissioned officers. By the end of the war the section had trained 34 platoons of the 56th Engineers, for a total of 45 officers and 1530 enlisted men.

The several sections of the A.A.A. School, in the end staffed by a total of 71 officers, trained an aggregate of 578 officers and around 12,000 other ranks in the new arts required by the Antiaircraft Service. The instructors were quick to learn those skills from the Allies, and very capably and swiftly taught them to the men who arrived to fill the new A.A. units at the front. Their success was also attributable in part to the basic personnel decision which sent to the A.A. Service technically qualified officers and men. The chief deficiency of the School was its inability to conduct coordinated training—mainly because the training grounds allotted to the A.A. Service by the French were so widely scattered. Gen. Shipton recognized the problem and began a search for a facility sufficiently large to encompass all of the Sections of the School. His staff surveyed possible locations, notably St. Jean de Monts, where the American aerial firing school of the Air Service was located, and Camp d'Avord, a French training ground. Neither became available in 1918 however, and the school remained dispersed right up to the time of its dissolution at the end of the war.

The acknowledged heart of the A.A. Service was artillery, and the War Department's plans for assigning to that duty the experienced professional artillerymen of the prewar Coast Artillery Corps reflected its determination to secure first-class gunnery. In practice, however, the personnel situation was hardly so rosy. The Regular Army had never been terribly large, and in the case of the artillery, the 170 Regular companies of Coast Artillery simply did not stretch very far when the manpower pie had to be sliced so many ways. The regulars were to be divided among railway artillery, heavy field artillery, trench mortars, and antiaircraft artillery units. The A.E.F.'s two brigades of railway artillery and seven brigades of heavy field artillery alone called for 162 batteries on the basis of twenty-seven regiments of six batteries each, and the regiments were initially composed of twelve batteries each.[18] The field and heavy artillery regiments were organized first, and the Army commanders had a direct and immediate interest in the organization of the trench mortar units, so that there was never any chance that any sort of artillery could be completely professional in its personnel. Despite the best intentions of the planners, then, the A.A. Service, like all artillery units, had to make do with just a sprinkling of regulars in each battery. The bulk of the soldiers had to be drawn from the volunteers and draftees. When the 2d A.A. Battalion was organized in the South Pacific Coast Artillery District of California, two of its batteries were designated for National Guard soldiers, with the balance of the battalion drawn from the Regular Army.[19] Sgt. William C. Cameron, a gun section commander in the 3d A.A. Battalion (C.A.C.), for example, wrote in later years with some pride of the exclusively volunteer character of his battalion, one of the first of the A.A. gun battalions to be formed.[1] In general terms, the same manning problems affected the machine gun battalions and searchlight troops of the A.A. Service as well.

Part of the solution to the problem of obtaining professionalism lay in training, and the careful technical instruction given by the A.A.A. School in France went a long way toward compensating for the lack of experienced gunners. The prewar professionals found themselves swiftly appointed to noncommissioned ranks which in peacetime would have taken them years to achieve. They shared their skills and experience with the men in their charge—a mixed bag of soldiers who ran the gamut from the well-educated to the illiterate. Sgt. Cameron recalled one of his own men, for example, a Pvt. Brewer, who was completely unlettered and had to be prompted to shout his number when the squad counted off.[21] The Adjutant of the A.A. Service selected and appointed noncommissioned officers who could not only deal with all sorts of men, but also were physically able to handle the expected field duty. The day of the aged and grizzled NCO had passed, at least in the A.A. Service, where those key leaders had to be "young, intelligent and active." In fact, because the "A.A. gun drill [was] quite different from the Coast Artillery drill," the Adjutant made certain that all soldiers, not just the NCOs, were "energetic and active and quick."[22]

There was a continuing shortage of manpower throughout the war. As late as 19 March 1918, there was a total of only about 75 officers and 600 to 700 men in France trained for A.A. duty.[23] In June 1918 Gen. Shipton found himself for once in the position of having more guns than he could man, and called for the transfer of personnel from other arms to his Service.[24] A small part of Shipton's needs was met later in that month as an afterthought in the reorganization of the A.E.F.'s heavy artillery brigades. The 54th Artillery (Coast Artillery Corps) (Railway), was dismembered to form a Replacement Battery for the Railway Artillery Reserve and the cadres for several new regiments. The sighting of German aircraft over the GHQ at Chaumont at about that time prompted some thoughtful speculation on the part of the staff, and the headquarters shortly asked Gen. Shipton for antiaircraft defenses for the area. The cupboard at Arnouville was bare, however—Shipton had no units to send. The result was that the Commander of the 54th Artillery was directed to organize from his ever-shrinking regiment three provisional batteries of antiaircraft artillery.[25] Thus Shipton found the men for the Antiaircraft Defenses of Chaumont, but he continually had to argue with the GHQ in order to keep them.[26] His Adjutant fought a private war with the GHQ until the Armistice, trying to maintain the units of the A.A. Service at an acceptable strength, with a regular flow of qualified replacement officers and troops. All of the units of the command were chronically short of men, a situation which was never satisfactorily resolved.[27] Near the end of the war the GHQ authorized the formation of an A.A.A. Replacement Battery at Arnouville, which at least regularized the training and replacement procedure. As an adjunct to the schools system, the battery trained and furnished a total of 101 replacements to the A.A. battalions.[28]

The selection of officers provided the rest of the answer to the question of how the A.A. Service could become sufficiently proficient. Officers of the Regular Army were of course in great demand, and the A.E.F. specified that majors and higher grades were to be assigned to command battalions and larger units and to serve in tactical staff positions. They were not to serve in miscellaneous support and service units at all after 1 October 1918. Inasmuch as virtually all regulars from the prewar army had been promoted at least to captain in the National Army, very few experienced junior officers existed at all. Indeed, Maj. H. A. Schwabe of the 2d A.A. Battalion made an official complaint about shortages of qualified officers and the poor quality of some officers he had been sent.[29]

The shortage of regulars made it all the more important that those who were assigned to the A.A. Service should be those best able to absorb the new technology it had to use. Every Regular Army officer in the Service had a technical background, ranging from the general engineering training of the sprinkling of Military and Naval Academy graduates to degrees in mathematics, engineering, and the physical sciences of men from such schools as Yale, M.I.T., and the state agricultural and technical colleges. The remainder of the officers came from the Reserve Corps and National Guard or were commissioned in the National Army. They too were carefully selected men. Even most of the reserve officers had technical backgrounds, and those who did not worked hard to keep up. As one anonymous officer later wrote,

> There were four of us who were not technically trained men, but lawyers or merchants by profession, and I wish to say here that those men certainly did some wonderful work. They spent all their spare time studying mathematics and some even slept with a trigonometry book under their pillows.[30]

The Guardsmen were natural choices, because of their prewar experience and training which were in all essentials identical with that of the junior-ranking regulars. For the rest, the A.A. Service assignment policy specified that "*Officers* should be young, energetic, and have a knowledge of trigonometry, logarithms, geometry, and so on." Such officers, as in the case of the 2d A.A. Battalion, could be sent into the new A.A. course at Fort Monroe and, upon return, instruct their widely separated batteries in the rudiments of A.A. gunnery before ever going to France.[31] High quality officers combined with superior training to produce the efficiency that Gen. Shipton required.

He had rather fewer professionals than he might have wished, but he appears to have had more than he had any right to expect—perhaps a higher percentage of regulars than most of the other units of the A.E.F. enjoyed. Of a total of 394 officers assigned to the A.A. Service in 1917 and 1918, including Headquarters, School, and tactical units, 18.27% were regulars, while another 3.55% were the "semi-professionals" of the National Guard. Eighteen of the seventy-two regulars were

USMA graduates, and three more hailed from the Naval Academy. Thus 29.16% of the regulars came from the Academies, comprising 5.3% of the officers as a whole. Shipton distributed those officers overwhelmingly to command and operations staff positions, where their professional training could have the greatest impact. The reserves were assigned to the remaining staff positions, particularly as instructors in the schools, and filled the rest of the officer slots in the battalions. The best among them became battery and even battalion commanders as the war went on, and some few of them entered the Regular Army at the end of hostilities. Almost all of the officers of the 56th Engineers were from the Reserve Corps, and the records do not show any officer, including battalion commanders, of the Antiaircraft Machine Gun Battalion who was of the Regular Army.[32]

Once he had established a sensible method for procuring and training the sorts of officers and men he needed to make the A.A. Service work efficiently, Shipton was beset by an entirely different sort of problem. This time it was the domestic war of the front line army against the army in the rear. He had to cope with the perennial problem of preventing the Zone of the Interior from seeking its replacements from among the combat troops. A school of antiaircraft artillery had been added to the Coast Artillery School at Fort Monroe, Virginia, and it seemed logical to the commandant of the school to obtain his instructors from among the most highly trained officers in that art in the Army. Consequently he demanded that the A.A. Service send him trained officers to serve as instructors at Fort Monroe. General Shipton agreed that it would be nice to have a suitable A.A.A. school at Fort Monroe, but asked the commandant to remember that he had a war to fight. "No American officers now on duty in France should be sent back to the United States," he replied, and opined that "while any of these young officers would be useful at Fort Monroe school as assistant instructors, it is not believed that any of them are competent to take charge of the technical part of the proposed school." Having said that, Gen.

Shipton played what was obviously the winning card of this particular trick, as he concluded that "the services of all are very important here."[33] However illogical it might seem to siphon off trained officers from the fighting front, that is nonetheless what eventually happened. Officers of the A.A. Service were in time sent back to the United States, presumably to teach at the school. By September 1918 some fourteen had returned to the United States. Shipton's successor, Col. Jay P. Hopkins, took up the fight when he discovered that at least two of those officers who had grudgingly been given up were assigned to routine coastal defense duties, rather than to the business of training A.A. troops. In a scathing letter to the Army Adjutant General, evidently written outside of normal channels, Hopkins concluded by saying that "it is not believed that it is good policy to use the A.E.F. as a source of supply for officers for service in the United States."[34] It was the principle of the thing that Shipton and Hopkins fought, because the number of officers lost to reassignment was relatively small when compared to the total of officers assigned. They lost their fight, too, just as succeeding generations of commanders have fought and lost similar battles.

No single arm of service existed in 1917 to which the antiaircraft mission could logically be assigned, and the A.A. Service was in consequence an amalgam of branches which was commanded by the Coast Artillery Corps, the arm which had the principal responsibility for the task. Col. Jay P. Hopkins summarized the organizational problem succinctly in December 1918 as he contemplated the future of the A.A. Service:

> In our Army, the troops for this service were taken from those who were thought to be the best prepared to take up the new work with least delay. The artillery troops were taken from Coast Artillery Corps. The artillery materiel used is nearly that used by field artillery, but the methods of fire control more nearly approximate those of Coast Artillery. Machine gun

> troops were taken from Infantry, while the Director of the Machine Gun School is from the Marine Corps. Searchlight troops were taken from Engineers, probably because Engineer troops were the field searchlight troops; but the searchlights used were nearer those used by Coast Artillery. This mixture of troops into one service that requires a single tactical control has not prevented effective work, but the efficiency developed has been reached in spite of, rather than because of, this complication.[35]

Aside from the 56th Engineers, which attached normally-organized platoons to the antiaircraft units as ordered, the A.A. Service was therefore composed of two basic types of units. The infantry machine gun companies were organized into battalions, while the Coast Artillery gun batteries were organized into separate batteries, sectors, and battalions, depending upon their intended employment.

The organization of each of the six A.A. Machine Gun Battalions was very similar to that of the standard infantry machine gun battalion as used in the infantry divisions. Each consisted of a battalion headquarters and four machine gun companies. Commanded by a major, the battalion was authorized an aggregate of 28 officers and 737 enlisted men. The battalion was motorized, having a grand total of 85 cars, 77 motorcycles, and 27 trucks of various types, including one ambulance. Armament consisted of 64 machine guns, allotted at 16 per company. Of those, twelve per company were to be employed at any given time, with the remaining four being held in reserve as spares. Each company was organized on the basis of three gun platoons, each platoon having two firing sections. Commanded by a sergeant, the firing section was responsible for the operation of two guns, for which purpose twenty men, divided into two squads, were provided. Each squad was transported with all of its equipment by one of the cars authorized the company. Even though deployed immediately behind the front lines, the machine gun company had no rifles; the gunners were given pistols for personal protection.

The company commander, a captain, had a first lieutenant as executive officer. The 1st platoon was customarily commanded by another first lieutenant, while the 2d and 3d platoons were led by second lieutenants. In the projected Regular Army battalions, one of the first lieutenants and one of the second lieutenants were to be allocated from the Organized Reserve Corps or the National Army.[36]

Antiaircraft gun batteries in the rear areas were organized under the Antiaircraft Sector, each Sector having an authorized complement of four or more batteries, although some had fewer. A Sector was commanded by a Coast Artillery major, and was roughly equivalent to a battalion. It consisted of a Sector Headquarters and a Headquarters and Supply Company. With the planned four firing batteries, each of which was authorized 92 men, each Sector comprised a total of 17 officers and 438 enlisted men.[37] The Batteries engaged in rear area defense in the area of the Services of Supply were not mobile units, and were organized on the two gun standard. The original plan, under which each battery would have two gun sections and two searchlight sections, was not adhered to. In practice, the 56th Engineers simply attached Engineer Searchlight Platoons to the Sector headquarters to which the gun batteries were assigned.[38]

The gun battalions intended for front line duty were differently organized. Whereas the rear area batteries were numbered, the batteries of the front-line battalions followed the customary pattern of being designated by letter. The battalion had a Headquarters and Headquarters and Supply Company and four firing batteries. Each battery was armed with two guns. The battery commander, a Coast Artillery captain, had only one lieutenant, who functioned both as executive officer and as chief of one of the firing sections. The other firing section chief was a sergeant. Each battery had a total of 95 enlisted men, organized to man two truck-mounted guns. Those batteries were completely mobile, as compared to the semi-mobile batteries in the rear areas, each of which had only an automobile, four motorcycles, and six trucks.[39] Capt. Alvin C. Smith, who commanded Battery A of the 1st A.A. Battalion, preferred to ride a motorcycle to any of his other vehicles, because the motorcycle at least had pneumatic tires; he emphasized the rocky ride that the gunners got from the solid rubber tires of the De Dion truck's wheels. His battery was almost instantaneously mobile, he reports, because even the caissons were mounted on trucks; there was little to pick up and load when it became necessary to move.[40]

General Shipton found that the Headquarters and Supply Company of the mobile battalion had no real function when the battalion's batteries were scattered independently along the front. Each battery drew its logistical support from the division in whose area it was operating. He therefore took the opportunity to train the H & S Company as another gun battery, thereby providing five batteries per battalion.[41]

Discussion about the proper organization of gun units persisted until the war was over and the question became moot. At one time or another just about everyone expressed dissatisfaction with every existing type of organization. In the original conception, the battalion was envisioned as an integral unit for Corps or Army employment, while the numbered battery was expected to be of the greatest use in rear area work. The Sector was a battalion-level headquarters but was analogous to a brigade in that it had no permanently-assigned subordinate units. Instead, the independent numbered batteries were assigned in whatever quantities seemed appropriate for the task at hand.

Experience demonstrated the flaws in each organizational principle. In July 1918, only a few months after establishing the Antiaircraft Defenses of Is-sur-Tille, Capt. C. N. Wilson proposed that his 8th A.A. Sector should be reorganized as a battalion. He explained that the battalion was the usual type of organization in the Army, and that his batteries, being independent and isolated, were at a disadvantage with respect to pay, supplies, mail,ratings, reductions, promotions, and other details of administration.[42] Therfore he recommended making all A.A. organizations a common type, rather than different types, of units. At the same time, the GHQ expressed its dissatisfaction with the battalion organization Capt. Wilson so ardently sought. The French and British had withdrawn A.A. artillery from Corps and placed it under Army control—the day of divisional A.A. battalions being long in the future. With the adoption of Army assignment for American A.A. battalions, a shift in organization likewise became desirable. The batteries were always employed independently of each other anyway, and the battalion headquarters became an administrative impediment.[43] By grouping batteries into Sectors, the administrative problem incidental to detachment of a battery was to be eliminated because the records-keeping headquarters was the battery, rather than the battalion. Battery identification, being by number, would remain constant wherever the unit was assigned. The other advantages of the reorganization were that the size of Headquarters and Supply companies could be reduced, the two-gun battery could become standard, and because no distinction would be made in organization between front-line and rear area units, they would be interchangeable.[44] The reorganization was finally carried through, but not before the war was over, and the Sector organization only persisted until the general demobilization of 1919.[45]

The searchlight platoons of the A.A. Service all came from the 56th Engineers (Searchlight), permanently assigned to A.A. duty. Lt. Col. J. C. Gotwals, C.E., served as Searchlight Officer for the A.E.F., as well as commanding the regiment. The 56th Engineers had 60 officers and 2569 enlisted men organized into ten searchlight companies, each commanded by an engineer captain. The regiment dispensed with battalions. The company had seven officers and 250 men in five searchlight platoons, each capable of attachment to other units for independent operations. The platoon had three searchlights, for a total of 150 lights in the regiment.[46]

Command and control of the A.A. Service was relatively straightforward. The Chief of Antiaircraft Service directly commanded the fixed A.A. defenses in the area of the Services of Supply, as well as the service units, the staff elements, the A.A.A. school, and, through the commandant of that school, all units undergoing training. The Commanding General of each Army exercised direct control over the A.A. battalions assigned to the army, while the Chief of A.A. Service retained administrative responsibility for those units, inspected them and developed doctrine for their employment.[47] The Chief of A.A. Service of a field army accordingly served two bosses. In his role as administrative commander of the A.A. units he worked for the Chief of A.A. Service, A.E.F., while he was a subordinate of the Chief of Artillery of the Army when he exercised his role as tactical commander of the battalions. The staff of an Army's Chief of A.A. Service was a small-scale copy of the Staff of the A.E.F.'s Chief of A.A. Service. The Chief was a Coast Artillery Corps colonel, whose deputy, a lieutenant colonel of the same arm, also directed the Artillery Section. He had a machine gun section and a searchlight section, staffed respectively by an infantryman and an engineer. The staff developed the Army's A.A. plan and handled the tactical employment of the battalions at the Army Commander's disposal.[48]

Happily enough for all concerned, the personalities of the officers concerned at the various levels of command were completely compatible, particularly inasmuch as they all came from the same small, exclusive Coast Artillery "club" of the prewar Army. General James A. Shipton, who commanded the A.A. Service from 10 October 1917 through 29 June 1918, was then assigned to command the 58th Field Artillery Brigade. He was succeeded in command by an equally respected officer, Col. Jay P. Hopkins, formerly director of the A.A.A. School, who ran the Service until the end of the war.[49] The Chief of A.A. Service in First Army was Col. Robert Wilbur Collins, C.A.C., a widely experienced Regular who had previously commanded the 1st A.A. Battalion, the 8th A.A. Sector (AAD of Is-sur-Tille), and the A.A.A. School, and whose fighting experience included a stint as private soldier, sergeant major, and commissioned officer of Volunteer Infantry in the war with Spain.[50] His counterpart in the Second Army, the A.A. Service of which was not established until October 1918,[51] was Colonel George Thompson Perkins. Perkins was a USMA classmate of Col. Jay Hopkins, both having graduated in 1900. He had come to France in command of the 53rd Artillery (Coast Artillery Corps) (Railway), and was appointed Chief of A.A. Service for Second Army after serving in the Headquarters of the A.A. Service for a time and then attending the A.A.A. School.[52]

The prodigious labors of the soldiers in the A.A. Service, as in the rest of the army in France, were blighted by the disgraceful inability of the United States to arm and equip them. The vast industrial potential of the nation, ill-directed, could not be turned to the production of the war materiel American soldiers needed. Within the War Department, the various arms of the Army feuded over side issues of prestige and relative importance, and the Ordnance Department worked to a slow, peacetime schedule in its approval and production of artillery designs. The well-known production fiascos were not limited to failures in providing field and heavy artillery, combat aircraft, aircraft engines, and small arms, but also extended to antiaircraft artillery and personal equipment.[53]

As late as March 1918, during the great German offensive, the A.A. Service still had not received even its basic issue of personal equipment for each soldier. Alerted by the French authorities to be ready to participate in the emergency defense of Paris if the German attack succeeded, Col. Jay P. Hopkins enumerated the limitations of his 500 men from the A.A.A. School. He naturally recommended that the men could serve with the most usefulness in antiaircraft artillery units, but if they had to be used as infantry, he asked that the French recognize that

> We have no gas masks at all, but only 306 rifles, a very limited amount of ammunition, and no helmets.[54]

It is hardly any surprise that an army which had difficulty in giving all of its men the most basic of equipment had even greater problems when confronted with the task of giving them complex and highly technical weapons.

The 3-inch antiaircraft gun for which the General Organization Project of the A.E.F. called was never to be available before war's end, although the Ordnance Department continually promised delivery. A total of two hundred 3-inch guns were scheduled for deployment in the Services of Supply alone, and none of them were ever delivered. Requirements always exceeded deliveries by fifty percent or more in all types of guns, with a consequent delay of four months for any given unit between completion of training and equipping. Such guns as were provided for the A.A. Service came from the French, but the Ordnance Department continued to project—and then delay—deliveries of American artillery materiel.[55] The correspondence of the A.A. Service reflects that uncertainty, as the Artillery Officer periodically queried his staff about the current expectations on receipt of guns.[56] The bad news came in one large parcel; a total of 353 4.7-inch A.A. guns of new design had been promised from the United States by September 1918. All were deleted. Some 1,127 75-mm trailer-mounted guns were expected from the Ordnance Department in the same month; they were canceled. By October, still having received nothing from Ordnance, the A.A. Service commander had become insistent in his reports. Writing to the GHQ in that month, Col. Jay Hopkins complained that the long-expected 3-inch guns on trailer mounts were now urgently needed because

> The necessary personnel is already at the front serving with French units, pending receipt of our own guns.[57]

Hopkins clearly had some difficulty satisfying his subordinates about the conspicuous absence of American equipment, whether of American design or simply of American manufacture. Col. R. W. Collins, Chief of A.A. Service for First Army, asked him plaintively in a personal letter of early October, "How about American materiel? I have heard a rumor that 12 of the 75-mm Whites have arrived."[58] The situation with respect to machine guns was no better, as Maj. A. B. Drum noted in April 1918, when he wrote that

> It is believed that we will have to depend upon the French for supplying machine guns for at least one year longer, as the infantry has first call on all Brownings and the aircraft on the Lewis.[59]

The supply of American searchlights was rather better, most probably because no one else in the A.E.F. had any use for them. The limitations of the smaller lights were such that Gen. Shipton had called for replacement of all foreign searchlights with American 60-inch lights withdrawn from U.S. coastal defenses.[60] Nonetheless, no American searchlights were available in France at the end of February 1918.[61] In September 1918, the 56th Engineers was using forty French 36-inch lights, one British 48-inch light, and a total of twenty American 60-inch and 36-inch lights.[62]

Eventually the entire A.A. Service gave up on supply of equipment from the United States as a bad job and resigned itself to relying upon the French to equip the units. There, too, the Americans found the way littered with stumbling blocks. The French had already been at war for three full years when the Americans arrived on the scene. They were in mid-1917 stretched to the limit, both in personnel and in equipment. Gen. Shipton quickly discovered that the French had little to give him or even to sell to him in the way of antiaircraft equipment. In August 1917 the United States, through Lt. Col. C. C. Williams, an Ordnance officer at the American embassy in Paris, asked the French government to supply forty-two 75-mm auto-cannon for use with the U.S. II Army Corps. The Minister of Armaments replied that such a delivery was impossible. He demanded to know how many guns were realistically required, and what help the United States could give in furnishing the raw materials from which to manufacture artillery.[63] Not only were deliveries of the 75-mm auto-cannon in doubt, but also supply of the less desirable semi-fixed 75-mm gun and trailer-mount gun stretched far into the future.[64]

At length, some guns arrived. Two 75-mm auto-cannon with all of their required battery equipment were purchased by the Army. They were picked up and delivered to Battery B, 1st A.A. Battalion (C.A.C.) on Wednesday, 3 April 1918. Those were the *only* antiaircraft guns to be owned by the United States during the war.[65] An additional quantity of auto-cannon sufficient to arm a total of two battalions was borrowed from the French, so that one fully mobile battalion was available for each Army. In a similar fashion, the A.A. Service equipped its rear area defenses with 75-mm guns borrowed from the French. The usual semi-fixed mount for static defenses was not available for issue to the Americans, however, and the Ordnance Department had to concoct an improvised mount for those guns. The basic gun mount consisted of a concrete pit one meter deep by four meters across, over which a wooden framework was erected. The framework supported the gun's traversing and elevating mechanisms, while the pit provided a clear space for gun recoil at high elevations.[66] Guns so mounted were certainly not mobile. In general, the Improvised Mount was never satisfactory, because it did not permit any precision in laying the gun. Col. R. H. C. Kelton, of the GHQG-3, found them to be useless. He took the time during an inspection tour to look closely at the Improvised Mount, and his horrified report explained his concerns:

> the open sights with which they are equipped are so primitive and so poor as to be almost a joke. Certainly an ingenious Ordnance officer should be able to improvise something better. . . .[67]

A critical look at the guns by qualified Coast Artillery officers gave no more favorable judgment. An officer visiting France from the A.A.A. School at Fort. Monroe wrote of the Improvised Mount that

> The gun carriages for the semi-fixed mounts looked to be very crude and inaccurate. They were evidently constructed by soldier labor rather than by mechanics. Gun could not possibly be accurately laid in azimuth.[68]

Considering the technical limitations of the equipment, it is no surprise to learn that the rear area defenses never shot down an aircraft. The value of such guns lay in the noise they could make, evidently, for the GHQ confessed that "improvised mounts . . . are nearly limited to night firing and barrage work."[69]

Supply of the antiaircraft machine gun presented a rather happier picture. The French Hotchkiss gun was a perfectly satisfactory weapon when used with the appropriate gunsight and tripod. The "Infantry Corrector" sight was a simple speed-ring sight which was accurate to 1000 meters.[70] The tripod mount could be equipped with an extension which permitted the gun to be fired at high angles by the simple expedient of reversing it in the trunnions. For rear area use, an even better practice was to mount the gun on a stake driven in the ground for all-around high-angle fire.[71] The original intention was to arm all A.A. artillery units, as well as machine gun battalions, with automatic weapons. Capt. Alvin Smith confirmed the need. He often wished for machine guns because a low-flying aircraft appeared too suddenly and flew too quickly for the battery to have time to lay the 75-mm gun on it.[72] As the Ordnance Department began tryng to procure the guns, however, it quickly became evident that there just weren't going to be enough of them available to give them to every unit.

Lt. Col. C. C. Williams, the long-suffering Ordnance Officer, negotiated with the French Armaments Ministry for sufficient Hotchkiss weapons for one A.A. M.G. battalion—95 guns with 20,000 rounds of ammunition for each gun.[73] The reply he received told him that his headaches stemming from problems in buying artillery were only going to get worse as he tried to buy machine guns. The French could sell him only 60 guns at that time and, worse still, because of ammunition production problems, could provide only 4000 rounds per gun.[74] It was some considerable time before field artillery regiments were issued machine guns for A.A. defense, and A.A. Artillery units never got them at all.[75]

In sum, the A.A. Service was limited in what it was able to accomplish by the shortages of equipment with which it had to contend. Almost every obstacle could be overcome through hard work, training, drill, and persistence. The shortages in trained manpower could be made up; the dearth of professional artillerymen could be compensated for by means of training; and the want of antiaircraft experience could be made good by the painstaking work of technical observers. Well-trained batteries and battalions issued from the A.A.A. School, ready for war. But the lack of equipment made all of that hard work almost pointless. When it came to the fighting, only a few of the A.A. Service's units ever received the equipment they needed. Only a few, therefore, ever established a combat record.

ENDNOTES

[1] Cullum File, J. A. Shipton ('92 #3464), Association of Graduates, U.S.M.A., West Point, N.Y.

[2] "Report of G-5. Appendix No. 16. History of Army Anti-Aircraft School," 1918, in Records of the A.A. Service, A.E.F. National Archives Records Group 120, Ex. 741-745, 911, Reel 11 (hereinafter cited as AAS Records).

[3] Cullum File, G. P. Anderson ('14 #5278), Association of Graduates, U.S.M.A. Entry for G. F. Humbert, *Register of Graduates, U.S.N.A.*

[4] The Service was organized under T.O. 422. AAS Records, Reel 4.

[5] "Report of the Chief of Artillery, A.E.F. Anti-Aircraft Service," 1918. AAS Records, Reel 11.

[6] Letter, Director Artillery Section, A.A.A. Service, to Hq., Army Schools, Subj: History of the School, dated 30 November 1918. AAS Records, Reel 4. "The Early Days of Anti-Aircraft. The C. A. C., the First American Troops to use Anti-Aircraft Artillery," in *Liaison. The Courier of the Big Gun Corps,* Vol. I No. 10 (22 February 1919), pp. 73-74.

[7] *Ibid.* "The Early Days of Anti-Aircraft," *op. cit.*

[8] "Report of the Chief of Artillery, A.E.F. Anti-Aircraft Service," *op. cit.* For details on Hopkins, see his Cullum file ('00, #3959), in Special Collections, U.S.M.A. Library, West Point, New York.

[9] *Ibid.* The School was recognized in Par. 1, Sec III, GHQ, AEF, GO 46, 10 October 1917, which established the Anti-Aircraft and Trench Mortar School as part of the Army Schools system, with Gen. Shipton as Commandant. See AEF-OR, Vol. XV, pp. 185-186, and Vol. XIV, p. 388.

[10] The entire discussion of the A.A.A. School is based upon three major documents: "Report of G-5. Appendix No. 16. History of Army Anti-Aircraft School," in 1918, in AAS Records, Reel 11; "Report of the Chief of Artillery, A.E.F. Anti-Aircraft Service," in AAS Records, Reel 11; and Letter, Director Artillery Section, A.A.A. School, to Hq., Army Schools, Subj: History of the School (30 November 1918), in AAS Records, Reel 4. Details taken from other sources are separately cited.

[11] Mr. Alvin Smith, then a Regular Army Lieutenant in Battery A, 1st A.A. Battalion (CAC), attended the British school as well as the American school. He attached no importance to the British course, an attitude shared by most Americans on the A.A.A. School faculty. Interview with Alvin Smith, 26 August 1982. Also see Ltr, Capt. Glenn P. Anderson, C.A.C., to Commandant, A.A.A. School, Subj:Visit to England and British Front, 26 March 1918. AAS Records, Reel 6.

[12] A number of those reports survive in the A.E.F. records. For example, see Letter, Officers attending Ecole D.C.A. to Chief of Anti-Aircraft Service, Subj: Report on Work from June 5-13 (14 June 1918), from Lts. Harold N. Marsh and Joseph H. Cochran, in AAS Records, Reel 4.

[13] ACofS G-5, Schools, AEF, Report of Army Anti-aircraft School, in AEF-OR, Vol. XIV, pp. 388-389. Also see "The Early Days of Anti-Aircraft." The C.A.C., the First American Troops to Use Anti-Aircraft Artillery," on *Liaison. The Courier of the Big Gun Corps.,* Vol. I #10 (22 February 1919), pp. 73-74.

[14] Discussion of the Machine Gun Section is based upon "Report of G-5. Appendix No. 16. History of Army Anti-Aircraft School," *op. cit.*; and "Report of the Chief of Artillery, A.E.F. Anti-Aircraft Service," *op. cit.* Details from other sources are separately cited.

[15] Cullum File, Simpson, W.F.L. ('04 #4310), Association of Graduates, U.S.M.A.

[16] Discussion of the Searchlight Section is based upon "Prospectus, The Army Anti-Aircraft Searchlight School, A.E.F.," in AAS Records, Reel 8; "Report of G-5. Appendix No. 16. History of Army Anti-Aircraft School," *op. cit.*; and "Report of the Chief of Artillery, A.E.F. Anti-Aircraft Service," *op. cit.* Other sources are separately cited.

[17] GHQ AEF SO 161 of 10 June 1918 made the Searchlight School part of the A.A.A. School; the Searchlight Section of the A.A.A. School was then established on 29 June 1918 by direction of the Chief of A.A. Service.

[18] AEF-OR, Vol. 15, Final Report of the Chief of Artillery, A.E.F., pp. 177-204. Also AEF-OR, Vol. 1, p. 137.

[19] The 51st, 52nd, and 53rd Artillery regiments were exceptions to the rule, having been composed almost entirely of regulars (36 batteries). They organized in early 1917, however, and began to be diluted once in France as they were required to provide cadres for new heavy artillery units. See Confidential Ltr., AG of the Army to CO, South Pacific Coast Artillery District, Subj: Second Anti-Aircraft Battalion, 4 January 1918. AAS Records, Reel 15.

[20] William C. Cameron File, World War I Research Project, Army Service Experiences Questionnaire, MHRC, Carlisle Barracks, Pa. Also, Correspondence with W. C. Cameron 1982-1983.

[21] *Ibid.*

[22] Memorandum A.A. Service "Anti-Aircraft Artillery Units," n.d., but 1918, in AAS Records, Reel 15.

[23] Memorandum for ACofS, G.3, Subj: Conference on Anti-Aircraft Defense, 19 March 1918. AAS Records, Reel 2.

[24] Ltr, Chief of AAS to CiC, AEF, Subj: Anti-Aircraft Defense, 3 June 1918. AAS Records, Reel 10.

[25] HQ RAR SO 30, 17 June 1918, in AAS Records, Reel 2. HQ RAR GO 12, 4 August 1918, provides details for reorganization, in NARS RG 120, Ex. 731, General Orders (RAR), 1918-1919. Also see GHQ AEF GO 116, 15 July 1918.

[26] Memorandum to CoS, G-3, from Chief, A.A. Service, 8 November 1918. AAS Records, Reel 2.

[27] *Ibid.* Also see Memorandum For The Adjutant, Army Artillery, 1st Army, dated 1 July 1918, in AAS Records, Reel 3, which discusses unit vacancies; Personnel Requisitions of 20 November 1918, in AAS Records, Reel 3, which shows shortages in all units. Little information exists about the personnel situation in the 56th Engineers, but the AA MG Battalions were in even worse condition than the gun battalions. See Memo For Col. Hopkins, from R. E. Lamb, Capt., Adj., 4 September 1918, in AAS Records, Reel 6, which shows 32 casualties in the 1st AA MG Battalion alone; also a requisition for 40 privates for the 1st AA MG Battalion and 23 for the 2nd AA MG Battalion, in Replacement Requisition No. 12, A.A. Service, 9 October 1918, in AAS Records, Reel 3. The problem was finally solved by fiat: in Ltr, Chief of A.A. Service to Subordinate Units, Subj: Replacement Requisitions, 22 November 1918, in AAS Records, Reel 3, commanders were told than "no further personnel requisitions will be submitted."

[28] Memo for Chief of Artillery, AEF, from 1st Section GS, AEF, 31 August 1918, Subj: Organization of Artillery Replacement Battalions and Batteries, in AAS Records, Reel 3. Also see AEF-OR, Vol. XII, p. 154, Report of ACofS G-1, AEF.

[29] Ltr, Adjutant General, AEF, to CG, Army Artillery, Subj: Availability of Regular Officers, 13 August 1918, in AAS Records, Reel 3. Improperly utilized regulars were ruthlessly reassigned. Ltr, CO 2nd AA Bn to CO, So. Pac. C.A. Dist., Subj: Shortage of Officers, 2nd Anti-aircraft Battalion, 5 March 1918. AAS Records, Reel 15.

[30] Based upon analysis of backgrounds and careers of all Regulars assigned to the A.A. Service. The rosters were extracted from AAS Records. For example, see HQ AAS SO 32,

23 November 1918, in AAS Records, Reel 1, which lists officers commanding and assigned to tactical units of the AAS. Personal data was gleaned from the *Register of Graduates and Former Cadets, United States Military Academy,* the series of Cullum Files maintained at West Point on graduates of the academy, the Naval Academy *Register,* the *Army Register,* and station lists. Very little information was available about non-regulars, and no generalizations have been made about them. "The Early Days of Anti-Aircraft. The C. A. C., the First American Troops to Use Anti-Aircraft Artillery," in *Liaison. The Courier of the Big Gun Corps,* Vol. I, No. 10 (22 February 1919), pp. 73-74.

[31] Memorandum, AAS, "Anti-Aircraft Artillery Units," n.d., but 1918, in AAS Records, Reel 5. Ltr, CO 2nd Bn. to CO, Coast Defenses of San Diego, Subj: 2nd Anti-aircraft Battalion, 17 April 1918; and Ltr, CO 2nd AA Bn to CO, So. Pac. C.A. Dist., Subj: Recommendations relative to 2nd Anti-Aircraft Battalion, 27 February 1918. AAS Records, Reel 15.

[32] Officer background analysis, *op. cit.*

[33] Ltr, Brig. Genl. J. A. Shipton, to CoS, AEF, Subj: Anti-aircraft Artillery School at Fort Monroe, Va., 4 December 1917, in AAS Records, Reel 8.

[34] Ltr, Chief of A.A. Service, to AG of the Army, Subj: Anti-Aircraft Service, 5 September 1918. AAS Records, Reel 5.

[35] Memorandum, Hq., AAS, for ACofS, G-5, 19 December 1918. AAS Records, Reel 8.

[36] AEF-OR, Vol. I, pp. 315-316, for Table of Organization 106; also see Bulletin No. 63, GHQ, AEF, 24 August 1918, Section II, in AEF-OR, Vol. XVII, pp. 98-99. There were no Reserve, National Guard, or Regular battalions used in France; all units were constituted in the National Army.

[37] Ltr, CO, AAD of APO 712, to Chief of AAS, APO 728, Subj: Personnel for Defenses, 24 September 1918. AAS Records, Reel 6. Memorandum, Hq. AAS, Shipton to the QM, Army Artillery, 1st Army, 23 June 1918. AAS Records, Reel 5.

[38] Tables of Organization 237 (2-gun battery); 208 (75-mm battery), and 236 (4-section battery); TO 107 and 236 specified Sector organization. AAS Records, Reel 1.

[39] T.O. 236 was the basis for the Sector Headquarters; rear area batteries were established under T.O.237. AAS Records, Reel 1. AEF-OR, Vol. I, pp. 244-245.

[40] Alvin C. Smith interview.

[41] Ltr, Chief of AAS to CiC, AEF, Subj: First Corps Anti-Aircraft Troops, 8 June 1918. AAS Records, Reel 6.

[42] Ltr, CO, AAD of APO 712, to Chief of AAS, Subj: AA Arty Organization, 15 July 1918. AAS Records, Reel 2.

[43] Alvin C. Smith interview.

[44] Memorandum, GHQ, AEF, Subj: Proposed Tables of Organization No. 107 and No. 108, 23 July 1918. AAS Records, Reel 4.

[45] HQ AAS SO 32, 23 November 1918, in AAS Records, Reel 1. GHQ AEF requested authority for the reorganization on 24 August and received approval on 27 October. The AEF order which promulgated the change was GHQ AEF GO 205, 14 November 1918. See AEF-OR, Vol. I, pp. 126-127.

[46] AEF-OR, Vol. I, p. 262, T.O. 230. The 56th Engineers also had a flash and sound ranging mission. It appears that only four or five companies were searchlights, although ten were planned. The records are imprecise on this point. See Col. W. B. Parsons, *The American Engineers In France* (New York: D. Appleton and Company, 1920), pp. 260-261.

[47] Report of the Chief of Artillery, A.E.F., in AEF-OR, Vol. XV, p. 185. GHQ AEF GO 51, 3 April 1918 established the duties. AAS Records, Reel 4.

[48] T.O. 101, AAS Records, Reel 4. Report of the Chief of Artillery, A.E.F., in AEF-OR, Vol. XV, p. 214; T.O. 235, AEF-OR, Vol. I, p. 219.

[49] Report of the Chief of Artillery, A.E.F., in AEF-OR, Vol. XV, p. 185. Shipton was assigned per GHQ AEF GO 46, 10 October 1917; Hopkins was confirmed in the appointment by GHQ AEF GO 181, 16 October 1918.

[50] *Army Register,* 1921.

[51] A.A. Service of First Army was organized per GHQ AEF GO 51, 3 April 1918. When Second Army was organized, the Hq., A.A. Service, reverted to A.E.F. control, per GHQ AEF GO 181, 16 October 1918. AEF-OR, Vol. I, pp. 126-127.

[52] Cullum File, Perkins, G.T. ('00 #3987), Special Collections, U.S.M.A. Library, West Point, N.Y.

[53] The United States furnished its soldiers before the end of the fighting with: no tanks, no field artillery, no heavy artillery of American design, no railway artillery, no American-designed aircraft. Production of M1903 rifles fell far short of requirements; and the Browning .30 cal. machine gun appeared in France only in the last month of the war. Prof. T. Harry Williams provides an excellent discussion of the obstructionism of the War Department Bureau Chiefs, particularly in matters of supply, and of the strained relationship between Pershing and Peyton March, the Chief of Staff. See the chapter "The American Military System:From Civil War to Global Conflict," in his *Americans At War. The Development of the American Military System* (LSU Press, 1960).

[54] Ltr, Director of A.A.A. School to CG, Paris, Subj: Emergency Defense, 28 March 1918. AAS Records, Reel 3.

[55] "Review of U.S. Artillery Program, 66 Combat Divisions & 14 Depot Divisions By June 30, 1919," Office of Chief Ordnance Officer, American Expeditionary Forces, 4 October 1918, in William C. Koenig Papers, Box 1, MHRC, Carlisle Barracks, Pa. GHQ AEF SO 145 appointed the Equipment Board for Anti-Aircraft Service.

[56] For Example, Memorandum for Maj. Frazer from 1st Lt. B.F. Harmon, Hq. AAS, 26 July 1918, which informed him that

nothing was promised until August, when *five* trailer mounts were expected. AAS Records, Reel 9.

[57] Ltr, Chief of A.A. Service to CiC, Subj: Trucks for Gun Trailers, 26 October 1918. AAS Records, Reel 10.

[58] Ltr, R. W. Collins to J. P. Hopkins, 9 October 1918. AAS Records, Reel 5. Evidently a few 75-mm guns on White Trucks arrived in late October. See Ltr, Chief of AAS to Chief Ordnance Officer, Subj: Anti-Aircraft Guns on Truck Mounts, 20 November 1918. AAS Records, Reel 10.

[59] Ltr, Maj. A. B. Drum to Commander, AA & TM School, Subj: Suggestions on Organization and Duties of Anti-Aircraft Machine Guns, 11 April 1918. AAS Records, Reel 10. Subsequent correspondence indicates that the situation changed little over the succeeding six months.

[60] Ltr, CG A.A.A. School to CoS, AEF, Subj:AA Search Lights, 2 November 1917, in AAS Records, Reel 9.

[61] Ltr, Chief Engineer AEF to ACofS, G-3, Subj: Report on Operations of Searchlight Service, n.d., AAS Records, Reel 9.

[62] Memorandum from Gotwals for Col. Hopkins, Subj: Searchlight Materiel, 12 September 1918. AAS Records, Reel 10.

[63] Ltr, Ministre de l'Armament, Service Interallies, to Lt. Col. C. C. Williams, U.S. Embassy, Paris, 1 September 1917. AAS Records, Reel 9. The French had already stopped making the auto-cannon in favor of a trailer-mounted gun.

[64] Memorandum, AAS Hq., n.d., but 1977. AAS Records, Reel 10. Two semi-fixed guns were delivered by December 1917; no trailer-mounts before the end of 1918.

[65] Ltr, Director of A.A.A. School to Commandant, A.A.A. School, Subj: Service at Front for A.A.A. Troops, 8 April 1918. AAS Records, Reel 9.

[66] Memorandum. Relative to the Platform Mount for Vertical Fire of the 75-mm Gun Model 1897, n.d. AAS Records, Reel 10.

[67] Ltr, Memorandum for Assistant CoS, G-3, AEF, Subj: Report on Anti-Aircraft Installation at Is-sur-Tille, 3 May 1918. AAS Records, Reel 2.

[68] Notes Taken at "l'Ecole d'Arnouville," n.d. AAS Records, Reel 8.

[69] Memorandum, GHQ AEF, Subj: Proposed Tables of Organization No. 107 and No. 108, 23 July 1918. AAS Records, Reel 4.

[70] Notes on the Organization of Posts for Machine Guns in a Center of D.C.A. (Defense of Aviation Grounds), n.d. AAS Records, Reel 10.

[71] Ltr, Chief of AAS to Chief of Artillery, AEF, Subj: Bi-weekly Artillery Letter, 23 September 1918. AAS Records, Reel 4.

[72] Smith interview.

[73] Ltr, Chief Ordnance Office to M. le Ministre de l'Armament et des Munitions, Subj:Anti-aircraft machine guns and Ammunition, 2 August 1917. AAS Records, Reel 10.

[74] Ltr, Minister of Armament to Williams, 7 August 1917. AAS Records, Reel 10.

[75] Ltr, Chief of AAS to CO Valdahon, Subj: Information on AA MGs, n.d. AAS Records, Reel 5. Also: Memorandum, Hq. AAS for Adjutant, Army Artillery, First Army, 21 July 1918. AAS Records, Reel 5.

CHAPTER III

THE PARAMETERS OF SUCCESS: TECHNICAL AND DOCTRINAL

> "Official manuals, by the nature of their compilation, are merely registers of prevailing practice . . . ."
>
> —B.H. Liddell Hart
> *Thoughts on War,* 1944

Airplanes were irritatingly elusive targets. For every airplane they shot down, British gunners expended 10,000 rounds of ammunition. The French were more successful. The brought one airplane down with every 6,000 rounds and, beginning in 1917, with every 4,500 rounds. The Americans did better still, accounting for one aircraft with every 605 rounds fired.[1] Still, the records demonstrated that even airplanes built in the first fifteen years of aviation history were usually capable of evading the best efforts of all three Allied antiaircraft arms. As Capt. Alvin C. Smith recalled, "we . . . brought down officially just one or two after shooting at them for several months."[2] Not surprisingly, Smith and his colleagues often felt frustrated. If it was true, as reported at the Army War College in the 1930s, that *twenty percent* of all airplanes shot down between 1914 and 1918 by all warring powers were shot down by antiaircraft guns, then prodigious quantities of powder must surely have been burned.[3]

The bounds of success enjoyed by American antiaircraft gunners were circumscribed neither by want of effort nor by lack of dedication. The difficulty lay instead with antiaircraft technology and with the limitations that technology imposed upon the doctrine developed during the war for use of antiaircraft weapons and units. The use of airplanes as weapons of war constituted one of the many technical surprises of the Great War. The new air weapon, although in its infancy, was nonetheless far more sophisticated than the means available to ground forces to counteract it. Antiaircraft gunnery had its teething problems during the years of the Great War, sharing its youth with the airplane it was spawned to oppose. Despite the enormous energies lavished upon the fire control problem by Gen. Shipton and his technically-minded staff, it remained at best what one frustrated American dubbed the "guess-point-shoot-and-pray" system.[4] The Americans had no trouble in describing the gunnery problem mathematically,[5] but found that the primitive equipment available to them prevented them from translating their theoretical appreciation of the problem into efficacious practical techniques.

The Coast Artillery Corps had long since solved the traditional gunnery problem and was able to lay fire upon moving targets with considerable precision. But whereas firing at hostile ships from shore batteries involved two linear dimensions and a slow rate of change of target position, antiaircraft fire was complicated by the addition of a third linear dimension and a swift rate of change of target position. Students at the A.A.A. School received an explanation of the difficulty which informed them that

> It can thus be seen that instead of the old problem of solving a plane triangle of which certain angles or sides are known, we are now confronted with the more complicated problem of the tetrahedron, and this problem must be solved on the instant. Added to this, there is probably no target whose course is more rapid

> and irregular . . . . In brief, we must locate the target, and by measuring certain quantities determine the position of the target at the instant of burst of the projectile, and train the gun on that point.[6]

The resolution of a gunnery problem which involved so many complex variables naturally involved the use of a great deal of complex equipment. A.A. gunners had a plethora of exotic-sounding devices to aid them in determining elevation, speed, and direction of the target, and in setting superelevation and lead angle on the gun. Among other gadgets, Americans had to master the use of the Goniograph, Sitgoniograph, Telemeter, Angle of Approach Telescope, Brocq Predicting Apparatus, Routin Mechanical Tachymeter, Goniotachymeter, and Sitogoniotachymeter. All of that equipment, only parts of which, mercifully, were required by any one battery since they involved varying techniques for solving the same problem, aimed at achieving a very simple end. The data collected and processed by those gadgets resulted in a mechanical solution of the vertical and lateral deflection angles between the gun itself and the gunsight. The desired end was that the gun should point constantly at the future position of the airplane, while the sight should be focused upon the present position of the airplane.

The complications did not end with firing at the predicted position of the airplane, because the pilot was free at any time to maneuver in any of three axes and to vary his speed. All too often, he did just that, causing the battery to miss. Capt. Alvin Smith recalled that

> . . . we naturally didn't hit the plane very often because the plane was going too fast. It would take about seventeen seconds from the time that you fired until the explosion; the plane could go a good distance in that time. The *theory* was that the plane would go at the same altitude and the same speed during the flight of the shell. Of course, if it didn't, then you had a problem.[7]

Smith's jocular reflections point up one of the fundamental truths with which A.A. gunners had to live—normal adjustment of fire was just not possible because "the burst seen is the result of a shot fired from 20 to 30 seconds before the observation." The A.A. Service could not use observed fire techniques because "there are no reference points" in the sky, and "it is impossible to tell during firing whether the target reached the predicted point in space and the projectile failed, or whether the projectile burst true and the aeroplane changed its course."[8] Capt. Glenn P. Anderson had a firm grasp of the problem and described it in terms of the probability of getting a hit:

> The average speed of modern aeroplanes is fifty meters per second. In thirty seconds the target will have traveled 1500 meters, or approximately, one mile. Furthermore, the aeroplane may travel in any direction and turn as often as the pilot desires. Thus, we are forced to consider that the future position of the target is any point within a sphere of 1500 meters radius. The volume of this sphere is 5,000,000,000 cubic meters. The volume of the danger sphere from a high explosive shell is 5,000 cubic meters. Thus, the chance of the aeroplane coming into this danger zone is one in one million.
>
> Now, in reality, the aeroplane does not go straight up or straight down . . . so we may limit the size of the sphere, representing the possible future positions by assuming that the target will not go up or down more than 100 meters. The volume of this double truncated sphere is 550,000,000 cubic meters, and the chance of hitting the target is one in one hundred and ten thousand. That is, assuming that your gunnery is absolutely perfect, the chance of hitting is less than one in one hundred thousand.[9]

Even when the correct solution was reached and the gun was truly laid, success did not always follow because, as the A.A.A. School complained, the "action of fuzes in the higher atmosphere is most perplexing."[10] It seems that the shells burst unreliably in range and altitude, for no very clear reason. The fuze burned at variable rates in the upper air, whether as a result of the effects of the rarefied gases there, of the rotation of the shell, or of other mysterious causes, no one could be sure. A redesign of the fuze eventually reduced the variation of fuze function, but unreliable fuzes complicated gunnery for months.[11]

In sum, the business of shooting at airplanes was always difficult, frequently unsuccessful, and occasionally frustrating. The limitations imposed by the degree to which fire control equipment had been perfected restricted the effectiveness of A.A. artillery and imposed corresponding constraints on the doctrine for its employment. Those restrictions led the A.A. Service to consider a whole series of other possible ways to defeat airplanes—ways which might offer a more certain chance of success. The Headquarters was literally bombarded with ingenious schemes for destroying aircraft, most of which were improbable, if not ludicrous. The staff quickly turned from soliciting such ideas to fending them off, but in the beginning the hope of finding something more effective than artillery led them to look closely at everything they were offered.

More often than not, one quick glance was enough. One such idea had the virtue of true simplicity. Mr. Frank D. Priory was a civilian construction engineer serving with a firm of contractors in France. He wrote to offer his idea of a means to prevent air raids. "Construct nets of manila rope wrapped with barbed wire, or plain wire charged with electricity, or all barbed wire," he suggested, "and suspend these nets in series, from balloons which would be stationed in the lane of the enemy air machines."[12] Mr. Priory's vision of German airplanes ensnared in his aerial web was undimmed by Shipton's polite reply that balloons simply could not lift such a weight to the requisite altitude. He immediately replied that special airplanes should be constructed to *tow* the nets, and closed with an offer to visit A.A. Service headquarters to explain in detail.

Another plan tendered to the Chief Ordnance Officer of the A.E.F. was promptly shuffled off to the A.A. Service. One M. Moine, "who frequently comes to this office," as Capt. R. L. Goetzenberger drily wrote when he transferred the action to the A.A. Service, thought to have solved for all time the filthy practice of bombing hospitals. His plan, submitted together with a photograph of the actual device and detailed blueprints, relied upon a chimney of 18 meters in height and two meters in diameter. The device was to be erected at the very spot one wished to protect from bombers. At the approach of the enemy, great quantities of acetylene gas were to be burned in the chimney. M. Moine foresaw that this would cause "at very great heights the displacement and rippling of the air so violent [sic] that no airplane will be able to hold its equilibrium in the space above . . . to a radius of more than 1000 meters and of 3000 meters height."[13]

Other suggestions were more practicable, most having to do with the design of instruments to locate and describe the position of aircraft in space. Most of the suggested devices were described in detail, usually illustrated by blueprints, and inevitably accompanied by reams of tedious mathematical calculations to prove the inventor's point. None was adopted, for various reasons. Some began from a false premise, some were good ideas which were too complex for use in the field, and others relied upon instruments of inordinate precision of manufacture.[14] All were politely declined, although the staff must often have wanted to reply in the language Gen. Shipton used in a letter to Gen. Pershing about one such instrument he had been offered:

> The device . . . shows considerable mechanical ingenuity, but it likewise evinces . . . lack of familiarity with the complex problems which the Antiaircraft Artillery has to solve . . . . Four

> years ago this device, in spite of certain fundamental defects, might have been worth consideration . . . .[15]

Of course, most of the methods the A.A. Service evaluated were absolutely hair-brained, and the remainder, while having perhaps the germ of a good idea, were simply impractical. The American penchant for an innovative and simple mechanical device to do any job was not to be served, and Shipton's staff was obliged to return to the tools at hand. They proceeded to determine how best to use the means they did have of defending against aircraft.

Several factors determined the shape of American antiaircraft doctrine. First among them was the experience of the French who, after all, had been in the business of shooting at airplanes for some time. Shipton's decision to use French equipment and gunnery techniques necessarily meant that American combat doctrine would be in large part quite similar to French tactics. Many of the basic decisions borrowed from the French were merely good common sense. For example, the use of static defenses in rear areas while reserving mobile units for front line employment was an obvious decision.[16] The second factor which shaped doctrine was the ability of the antiaircraft equipment on hand to do the jobs assigned to it. In this regard the key was not the range of the 75-mm gun which, with a muzzle velocity of 1,850 fps and a 20-second fuze, could reach the operating ceilings of most aircraft of the day, but the limited accuracy of the fire control equipment. Finally, doctrine was also shaped by the practical considerations of the number of men and the quantity of equipment available to do the job.

One might logically assume that the purpose of antiaircraft artillery was to shoot down airplanes. One would be wrong. The mission Gen. Shipton and his successor, Col. Hopkins, assumed was rather more sophisticated than that. Hopkins reported to Gen. Pershing that

> The principal function of antiaircraft artillery is to prevent hostile planes from accomplishing

> their mission; preventing bombing planes from reaching their objectives; preventing the artillery observation planes from remaining in the vicinity of the target; driving off photographing planes; breaking up battle-plane formations, etc.[17]

The recurrent theme in Hopkins' statement of the fundamental object of the A.A. Service was prevention, or deterrence, and defense. Significantly, he nowhere mentioned the *destruction* of German aircraft as one of the legitimate aims of the Service. Col. Hopkins acknowledged the limited means at his disposal and the limited results which could be expected later in the same report to Pershing when he explained that

> . . . the aeroplane represents a most difficult target and the results which are accomplished by the Antiaircraft Service, are largely in keeping enemy planes at such a distance that they can accomplish their mission only with difficulty. Actually hitting planes is known to be fairly common, but to bring them down can be regarded only as a fortunate incident.[18]

The consequence was that the A.A.A. School drummed into its students the importance of keeping the enemy aircraft at a distance, of forcing them to a higher altitude, of decreasing their accuracy, of discouraging them, but not of killing them. "The purpose of anti-aviation defense," Shipton told his student officers, "is to protect our own forces and establishments from hostile attack and observation from the air." To accomplish this task, the A.A. Service had to keep "enemy aeroplanes at a distance," but not necessarily by shooting them down.[19] Again, the instructors exhorted their charges to "remember, first of all, that it is impossible to prevent the enemy from dropping his bombs if he so wishes. Our duty is to cause him to drop them in the wrong place."[20] The young officers also learned that their efficiency would be judged in terms of their success in driving the enemy away, rather than by the number of airplanes they shot down, "although it sometimes shows up rather well, when judged by this standard alone."[21]

The mission of the A.A. Service was therefore in part a concession to the capability of the equipment on hand to perform the tasks demanded of it. Wisely, neither Shipton nor Hopkins expected their men to shoot down many German airplanes, although they rejoiced in the victories the units did achieve, and quite properly called them to the attention of the G.H.Q. That which they did demand, however, was an antiaircraft defense which was suitably alert, vigorous, and noisy to deflect the enemy from his intended target. They knew that it hardly mattered if the sky were clouded with German warplanes, providing only that those warplanes were prevented from accomplishing any useful task. The specific techniques laid down for the units to accomplish that end were logical extensions of the basic mission.

The A.A. Service's perpetual shortage of men and equipment made it impossible to provide A.A. defense for all of the A.E.F., although early plans were grandiose. Capt. Charles Rollet, the French liaison officer, suggested an ideal arrangement of gun batteries to the Americans, borrowing heavily on French doctrine. He recommended that Gen. Shipton establish an area defense by setting up a gun line approximately two kilometers behind the front line trace, with each battery no more than four kilometers away from another. In that way any airplane could be fired upon by at least two batteries. On the average, he calculated, one gun per kilometer was required, with guns employed in units of two. The battery commander should in each case have tactical command of the searchlights and antiaircraft machine guns in his sector as well.[22] The G.H.Q.'s plan for A.A. defenses in the Services of Supply were similarly optimistic. The Defense Priority List for late 1917, for example, called for antiaircraft defenses at sixteen major locations.[23] Aerodromes, hospitals, ordnance shops, headquarters, and the like were all deserving of defense, but each required at least three, and normally four, gun batteries and up to four machine gun companies. With a minimum of one searchlight platoon per location that added up to sixty-four A.A. batteries with 128 guns, sixteen battalions of machine guns, and four searchlight companies. Rollet's plan for the Zone of the Advance called for a conservative estimate of fifty batteries, consisting of one-hundred guns and at least 4,500 men, or some *ten battalions* of A.A. artillery for the front line alone. His scheme also involved the assignment of one-hundred machine gun sections, or twenty-five companies from six battalions, and some twenty companies, comprising two regiments, of searchlights. Such a plan was clearly out of the question for the A.E.F.'s miniscule Antiaircraft Service. The G.H.Q. would not allot so many men to the A.A. Service, certainly not as long as the French continued to be willing to man A.A. batteries in the A.E.F. area of responsibility. More to the point, the French would not sell or loan the Americans enough artillery or machine guns for so grandiose a scheme.

The shortage of artillery was aggravated by a shortage of machine guns. Gen. Shipton wrote to Gen. Pershing in June 1918 to explain why so few points in the SoS were defended. He was driven by practical considerations to defending only those places where the threat was greatest, he explained, because

> the present condition of the supply of Antiaircraft personnel and materiel warrants [no] active defense . . . of points further from the front line than Is-sur-Tille . . . . After all important points nearer to the front line than Is-sur-Tille are provided with means of defense and Anticraft materiel and personnel become more plentiful, the question of defense of points further from the front should then be considered.[24]

Later in the same month, Shipton was obliged to restate his position. The 1st Antiaircraft Machine Gun Battalion was nearing the end of its training and was preparing for assignment to I Corps at the front. Pressured to assign the battalion to rear area defenses, Shipton explained again that, however valuable machine guns were in the integrated defense, they were needed more elsewhere. "There are many places in the S.O.S. which require Antiaircraft Machine Guns for their protection," he wrote, "but there are also many military establishments in far greater danger of attack from the air in the Advance Zone in which the divisions of the First Corps are serving."[25] The G.H.Q. really had no option but to approve Shipton's restrictions on the deployment of his few units and limited materiel.

The upshot was that the A.A. Service, mostly because of its lack of equipment but also for sound tactical reasons, adopted the basic doctrine of the point defense, rather than the area defense. Shipton struggled to man and arm even two gun battalions and two machine gun battalions for duty at the front and three gun sectors for rear area defense. There was never any chance that he could erect the kind of defensive wall against German airplanes called for by early plans. On the other hand, he realized that the passage of German airplanes over undefended but unimportant terrain was really irrelevant. Therefore the doctrine of point defense, which surely began simply as an economy of force measure, endured because it made good tactical sense.

Several aspects of tactical doctrine were direct outgrowths of the restricted accuracy of the fire control equipment. Such measures sought to increase the probability of getting a hit. Normal firing doctrine for gun batteries involved using both guns against any given target. The objective was to double the chances of hitting the airplane by tracking and firing upon it from two locations. In practice, particularly in rear areas, all batteries within range opened fire at every target, for the same reason.[26] The inherent inaccuracy of all A.A. weapons was further compensated for by the principle of volume of fire, one of the few doctrinal developments of the war to find official recognition. The War Department A.A. Manual, while recommending the use of guns in pairs or larger quantities, continued to the sober conclusion that

> Antiaircraft gunnery is . . . extremely difficult . . . . At best antiaircraft fire is very inaccurate and volume of fire must be used to compensate for this lack of accuracy.[27]

Speed was surely as important as accuracy, and the normal rate of fire for the 75-mm gun was twenty shots per minute. At that rate of fire, the gun heated up quickly, and some battery commanders piped water from nearby streams to cool their weapons, thus enabling them to reopen fire sooner. Firing at what was then the highest rate of fire ever delivered by artillery meant that the crews, particularly the fuze setters, had to be superbly trained.[28]

Volume of fire was used in concert with another principle deriving from the crudity of the available equipment. A maxim of A.A. firing was that "firing should not be adjusted, but prepared." The long flight time of the projectile made the usual observed fire impossible, and led to the requirement that "adjustment during fire should be discouraged and the adjustment made before firing."[29] The practical rule the gunners evolved was to prepare for engagements by making a number of trial shots daily in order to correct for air temperature, winds, humidity, and barometric pressure.[30] Because airplanes of the day generally navigated from terrain feature to terrain feature and preferred direct routes and such linear guides as roads to their targets, A.A. gunners were easily able to emplace their weapons along the most probable avenues of approach. Then they computed and prepared fire on points along that route, shifting from one prepared fire to the next as the airplane flew closer.

The doctrinal requirement for weapons mix provided for antiaircraft coverage from ground level up to the maximum effective range of the guns. The A.A. artillery dealt with airplanes from 3,000 feet to a maximum of 15,000 feet. In fact, however, an attacking aircraft which could operate above 12,000 feet attained a "safe altitude" from American A.A. guns and could pursue its mission unhindered by accurate fire.[31]

Below 3,000 feet the rapid crossing rate of the airplane worked against accurate shooting. To engage in elaborate computations in such a case frequently meant that the enemy was well beyond the effective range of the guns, or was masked by the surrounding terrain, before the gunners could get off a shot. The solution was to use antiaircraft machine guns together with antiaircraft artillery. The machine gun was accurate against low altitude raiders and was quick and easy to aim against a fast-moving target at any range up to 3,500 feet. The proper use of machine guns was simplicity itself. They were in the first instance to be used for the protection of combat divisions in the front sector; rear area units could provide their own antiaircraft machine gun defenses. The machine gun units had to be mobile enough to move with dispatch to the areas of greatest threat, where they emplaced in the area of the support trench. Guns were always used in sections of two weapons, thereby attaining a satisfactory volume of fire, and they were to be located no more than 800 meters apart.[32] Artillery and machine gun supported and protected each other as they defended their sector. In the ideal condition, the two were able to erect a continuous "envelope," as they have come to be known, of air defense over the area. The assumption was that each gun battery would have one searchlight and one or two machine guns attached. The fly in the ointment, of course, was that there were never enough machine gun units to employ in that way.

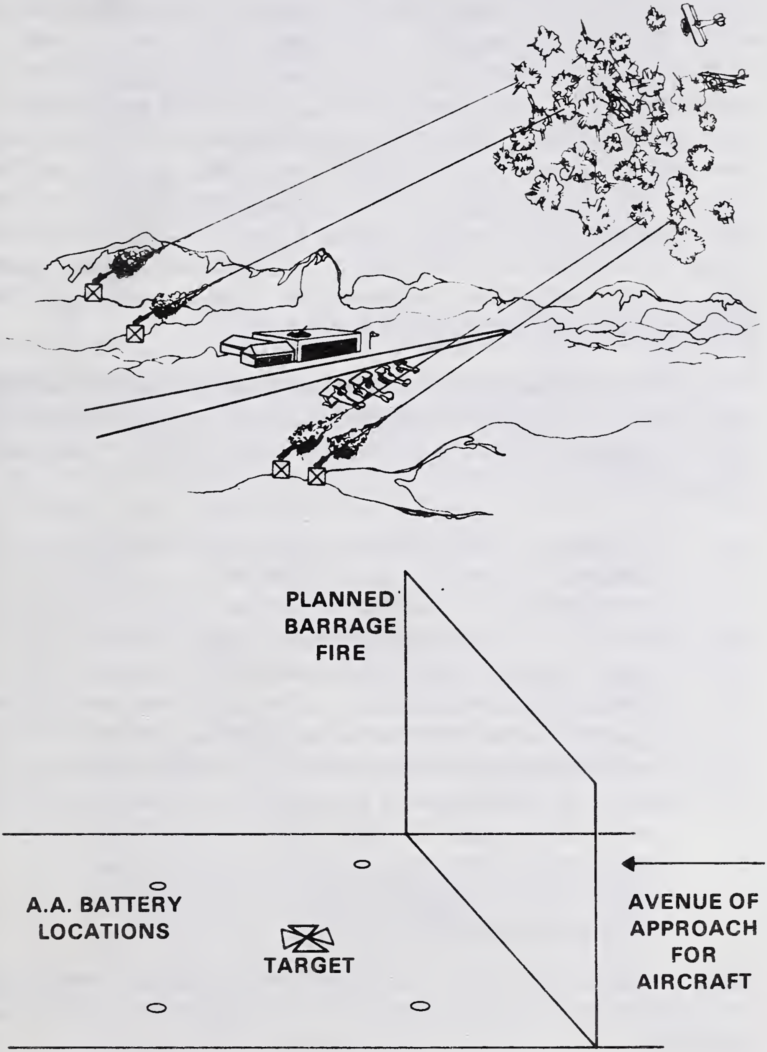
The restricted means of "active" air defense were reinforced by what Gen. Shipton's planners knew as "negative," or passive, means of defense. Such methods were required especially of large rear area installations which provided attractive targets. Luminous camouflage, or the creation of false targets at night by means of deceptive lighting, was supplemented in daytime by physical camouflage. At all new construction, buildings had to be dispersed so that not more than one could be hit by a given bombing run. Smoke screens and defensive balloons completed the major requirements for passive defenses.[34] Other measures the A.A. Service recommended to local commanders included construction of dugouts, traverses, shelters, and sandbagging for buildings to protect personnel, organization of fire departments, and local provision for rifle and machine gun fire against airplanes.[35]

Judicious use of established antiaircraft measures was expected to keep the enemy aviator at arm's length. As a matter of fact, airplanes were forced to fly at progressively higher altitudes as the war went on and the increasing efficiency of anti-aviation defense caused a correspondingly decreased efficiency of bombing airplanes.[36] That happy condition prevailed only during the day, however. The A.A. Service found that "that part of antiaircraft defense which has to do with *defense after dark* is lamentably weak in all armies."[37]

A.A. gunners had no hope of shooting down airplanes at night, save by accident. Gun laying equipment for night firing was extraordinarily imprecise. Sound locators detected airplanes and were used to line up both guns and searchlights on the probable location of the enemy. Azimuth and elevation data were passed from the sound locators to the guns, where the gunners took a stab at cutting fuzes the right length. Also useful in cloudy weather when searchlights were useless, sound locators were the more precise instrument.[38] Even so, the data were vague. The A.A. Service recognized that "it is very hard to locate the planes with the present searchlights," but also noted that "sound apparatus for locating aeroplanes at night is not yet in a satisfactory state of development, and, at best, can never be sufficiently accurate for anything more than general results."[39]

The doctrinal solution of the problem was barrage fire. The A.A.A. School defined it this way:

> Barrage fire is a fire whose elements have been prepared beforehand, for the purpose of opposing to the path of the hostile planes a vertical surface more or less covered by bursts of high explosive shell.[40]



BARRAGE FIRE

The purpose of barrage fire was twofold: to scatter enemy planes, preventing them from following any certain line of approach; and "to prevent them from getting into a position from which they can bomb their objective."[41] Barrage fire was a night-fighting technique, but was also used to defend observation balloons from low-level attack. Barrage fire was incidentally ideally suited to the poor excuses for guns the men in the rear area defenses were obliged to use. It did not really call for precise fire, which was good because the improvised gun mount did not admit of precise gun laying. It was fortunate that night flying was a difficult undertaking and, because targets were hard to find, sufficiently unproductive to counterbalance the unsatisfactory defenses raised against it.

In the best case, however, the total effect of the air defenses upon an enemy aviator was expected to be most gratifying. The A.A.A. School lecture on the subject was suffused with self congratulation:

> Throughout the whole discussion of Antiaircraft defense the psychological effect of the various forms of defense on the aviator play a large part. Imagine . . . an aviator traveling with orders to bomb a certain spot. He is worried by searchlights, advance batteries and perhaps machine guns from the time he crosses the line until he arrives at his destination. Here he is confronted by a heavy barrage. It is a determined aviator who will not drop his cargo of bombs outside the barrage and report the area bombed as per orders. We are the recipients of the bombs, but we have protected our area.[42]

Capt. Anderson put the proposition more plausibly when he explained how one did not have to hit an airplane to be effective against it:

> Consider the number of times that the aeroplane was hit without being materially

> damaged. Consider the effect on the aviator's nerves when a High Explosive went "BANGI" just one side, and he felt a sickening feeling as his machine tilted and plunged downward, even if he was later able to right himself and return in safety to his own lines. How much value should the Boche commander attach to the observations of a man working under such circumstances? Accurate observations are impossible and herein lies the true value of antiaircraft fire: "Make him dodge, dodge, and drive him up, up, up."[43]

The choice of shells for A.A. work reflected the A.A. Service's confidence in its decision to deter the enemy, rather than seek always to kill him. The two options were shrapnel and high explosive shells. The former threw jagged bits of metal in all directions when it exploded, while the latter relied upon the volume of explosive burst and concussion effect. Of the two, the shrapnel had a larger and more efficient volume of burst. The disadvantage was that the moral effect on the enemy was poor because the damage resulting from hits by fragments on his aircraft was generally small. Further, the body of the shell was a hazard to troops as it fell. As a result, the shrapnel was used only in the front lines and never in rear areas.[44] High explosive shells, by contrast, offered several advantages. The violent explosion of the shell was more feared by pilots because it *looked* more deadly. In effect, it was considerably *less* deadly, because its radius of burst was smaller than the shrapnel. The A.A.A. School taught, however, that

> At times when high explosive shell burst within a reasonable distance of planes, the air vibrations caused by the explosion have a very powerful effect, and planes have been seen sometimes to drop suddenly as much as one hundred feet upon the explosion of the shell.[45]

The high explosive burst was more spectacular and had the greater psychological effect upon both enemy and friend. The "moral effect on the inhabitants" of seeing the A.A. at work was an important consideration.[46] Thus the less effective shell was usually preferred.

Some aspects of the doctrine adopted by the A.A. Service had to be amended. The case of the use of searchlights was most dramatic. The basic idea was that searchlights would be used both at the front and in rear areas to illuminate aerial targets at night. Americans tried them thoroughly at the front against airplanes, but in time almost entirely withdrew them because "they were not effective, and their location was so easily determined that their destruction was certain where the enemy deemed it worthwhile." Searchlights held more promise in defense of rear areas "against slower moving, bombing planes that are flying at lower altitudes."[47] There they could be used without drawing artillery fire, and had the advantage, when used in groups, of blinding and dazzling enemy aircrew. Front line A.A. battalions therefore worked without searchlights—Capt. Alvin Smith never saw one at the front.[48]

Protective balloons, or barrage balloons, were accepted parts of the A.A. doctrine of the Allies, and the American A.A. Service desired to use them as well. Balloons were useful in defending rear areas because they could prevent the enemy from using certain lines of approach. Doctrinally, they were a sound idea, but the A.A. Service never had any of them. Early plans to use balloons had to be shelved because of the general manpower shortage. The Air Service, among others, demanded them for the protection of airfields until it learned that all Antiaircraft Balloon Battalions would be officered and manned by Air Service personnel but would be under the command of the Antiaircraft Service. Curiously, the threat to airfields appears to have disappeared rather suddenly, because Air Service requests for balloon protection abruptly ceased. None of the proposed four battalions was created, and the A.A. Service did without the barrage balloon.[49]

The doctrine adopted by the Antiaircraft Service, while establishing sound principles to govern the tactical use of A.A.

units, was based on practical considerations of the limits of technology, manpower, and supply. Although not expected to do so, the units which saw combat used that doctrine with such skill that they may fairly be called the most successful A.A. battalions of all of the Allied Powers. It remains now to look more closely at that combat record.

ENDNOTES

[1] Letter, Director Artillery Section, A.A.A. School, to Hq. Army Schools, Subj: History of the School, 30 November 1918. AAS Records, Reel 4.

[2] Smith interview. He commanded Battery A, 1st A.A. Battalion.

[3] The Army War College, Washington, D.C. Course at the A.W.C., 1934-1935. G-3. Report of Committee No. 4. Subj: Development of Weapons and Means of Communication. Training Doctrines. Appendix C to Supplement 1, "A Brief Sketch of the Development of Anti-aircraft Defense (1916-1918)," pp. 71-72. The study is based upon documents which have since been lost or otherwise made unavailable. It cites the following figures for A.A. victories in 1918: French, 220; British, 176; German, 125. MHRC, Carlisle Barracks, Pa.

[4] As quoted in John Bachelor and Ian Hogg, *Artillery* (New York:Ballantine Books, Inc., 1973), p. 67. The gunnery problem is further defined by Maj. Glenn P. Anderson in "With the Anti-Aircraft in France," in *Liaison* (Vol. I, #23, 24 May 1919), pp. 221-223.

[5] Lengthy and learned mathematical treatises abound in the AAS Records.

[6] A.A.A. School Lecture on Anti-Aircraft, in AAS Records, Reel 7.

[7] Smith interview.

[8] A.A.A. School Lecture on Anti-Aircraft, in AAS Records, Reel 7.

[9] Maj. Glenn P. Anderson, "With the Anti-Aircraft in France," in *Liaison. The Courier of the Big Gun Corps,* Vol. I No. 23 (24 May 1919), pp. 221-223.

[10] A.A.A. School Lecture on Anti-Aircraft, *op. cit.*

[11] *Ibid.*

[12] Ltr, Frank D. Priory to Hq. AEF, Paris, Subj: Aircraft Defense, 7 April 1918, and associated correspondence. AAS Records, Reel 1.

[13] Ltr, Design Section, Chief Ordnance Officer A.E.F., to CO, AAS, AEF, Subj: Device for Defense Against Aircraft, 12 June 1918. AAS Records, Reel 2.

[14] Correspondence relating to suggested A.A. devices, AAS Records, Reels 1 and 2.

[15] Chief of AAS to CiC AEF, 21 June 1918. AAS Records, Reel 2.

[16] A.A.A. School Lecture on Anti-Aircraft. AAS Records, Reel 7.

[17] Report of the Chief of Artillery, A.E.F., in AEF-OR, Vol. XV, p. 216.

[18] *Ibid.,* p. 217.

[19] Notes on A.A. Service Compiled by Shipton, Hopkins, and Anderson, n.d. AAS Records, Reel 7.

[20] A.A.A. School Lecture: Defense of Back Areas. AAS Records, Reel 7.

[21] A.A.A. School Lecture on Anti-Aircraft. AAS Records, Reel 7.

[22] Report on the Organization of the Anti-Aircraft Artillery of the American Defense Against Avions, 5 February 1918. AAS Records, Reel 7.

[23] Defense Plans-S.O.S. 1917. AAS Records, Reel 2.

[24] Ltr, Chief of A.A. Service to CiC, AEF, Subj: Anti-Aircraft Defense of Various Places, 1 June 1918. AAS Records, Reel 2.

[25] Ltr, Chief of AAS to CiC, AEF, Subj: 1st Anti-Aircraft Machine Gun Battalion, 24 June 1918. AAS Records, Reel 6.

[26] *Viz.*: various reports of firing in AAS Records, Reel 2.

[27] [War Department]. *Notes on Anti-aircraft Guns* (W.D. Document No. 575), (Washington: U.S. Government Printing Office, 1917), pp. 26-28.

[28] Maj. Glenn P. Anderson, "With the Anti-Aircraft in France," *op. cit.*

[29] Report on A.A. Service, n.d. AAS Records, Reel 4.

[30] *Ibid.*

[31] *Notes on Anti-Aircraft Guns, op. cit.* Also see A.A.A. School Lecture on Anti-Aircraft, n.d. AAS Records, Reel 7.

[32] A.A.A. School Lecture: Use of Machine Guns Against Aircraft, in AAS Records, Reel 7. Also, Ltr, Maj. A. B. Drum to Commandant, A & TM School, Subj: Suggestions on Organization and Duties of Anti-Aircraft Machine Guns, 11 April 1918. AAS Records, Reel 10.

[33] *Notes on Anti-Aircraft Guns. op. cit.*; also see Hq. A.A. Service, AEF, Memorandum Concerning American Anti-Aircraft Artillery School, 10 October 1918, in AAS Records, Reel 2. Also Ltr, Chief of AAS to Director, MG Section, A.A.A. School, Subj: Machine Guns for Fixed Anti-Aircraft Defenses, 5 September 1918. AAS Records, Reel 10.

[34] A.A.A. School Lecture: Defense of Back Areas. AAS Records, Reel 7.

[35] Ltr, Chief of A.A. Service to CiC, AEF, Subj: Anti-Aircraft Defense of Various Places, 1 June 1918. AAS Records, Reel 2.

[36] Notes on A.A. Service Compiled by Shipton, Hopkins, and Anderson, n.d. AAS Records, Reel 7.

[37] Hq. A.A. Service, AEF, Memorandum Concerning American Anti-aircraft Artillery School, 10 October 1918. AAS Records, Reel 2.

[38] Inclosure to Letter, Adjutant of A.A. Service to CO, A.A.A. School, Subj: Provisional Instructions for Firing by Sound, 24 June 1918. AAS Records, Reel 9. For a discussion of the details of sound location and searchlight direction, see Parsons, *American Engineers in France,* Chapter XIX. Also see Ltr, Chief Engineer *AEF* to CiC, Subj: Anti-aircraft Defense of AEF Areas, 21 March 1918; and Plan, CO SL Depot AEF to CE AEF, Subj: Allotment of Searchlight Personnel and Materiel, 19 March 1918. AAS Records, Reel 2.

[39] Notes on A.A. Service Compiled by Shipton, Hopkins, and Anderson, AAS Records, Reel 7.

[40] A.A.A. School Lecture: Barrage Fire. AAS Records, Reel 7.

[41] *Ibid.*

[42] A.A.A. School Lecture: Defense of Back Areas, *op. cit.*

[43] Maj. Glenn P. Anderson, "With the Anti-Aircraft in France," *op. cit.*

[44] Hq. AAS, AEF, Memorandum On the Minutes of the Second Session Inter-Allied Anti-Aircraft Committee, 12 July 1918 (Col. Jay P. Hopkins and Col. John O. Steger for the U.S.) AAS Records, Reel 7.

[45] A.A.A. School Lecture on Anti-Aircraft. AAS Records, Reel 7.

[46] Notes on A.A. Service Compiled by Shipton, Hopkins, and Anderson. AAS Records, Reel 7. Also Ltr, Lt. Benjamin F. Harmon the Chief of AAS, Subj: Recommendations Concerning Anti-Aircraft Shells, 24 May 1918. AAS Records, Reel 9.

[47] *Ibid.*

[48] Smith interview.

[49] Correspondence between Hq., AAS, and Hq., AS, *re* organization of defensive balloon battalions, proposed TOs, whence personnel should come, utilization, and control, August-September 1918. Memorandum for ACofS, G-1, from Chief of Artillery, AEF, Subj: Protective Balloons, 21 August 1918, laid the personnel requirement on the Air Service. AAS Records, Reel 5.

CHAPTER IV

AT WAR

Hurled headlong flaming from the ethereal sky
With hideous ruin and combustion, down . . .

—John Milton
Paradise Lost, 1667

Unbeknownst to its crew, the German L.V.G. observation plane that was doodling about over the lines south-east of Verdun on 18 May 1918 was about to make history. While it flew about its business in the spring sunshine that Saturday, Lieut. A. T. Slaten and the 2d Antiaircraft Battery were equally busy some 2,700 meters below, preparing to open fire at it. Slaten's men tracked the airplane carefully and established its range, speed, and altitude. Gunners' sweating palms twirled training handwheels to set that information on their weapons, and the muzzles of the two guns lifted obediently toward the sky. Other gunners cut the fuzes on the 75-mm shells to the proper burn time and loaded them into the breeches. Breechblocks clanged shut, and loaders stepped clear of the recoil. At last the guns spoke, their sharp, flat cracks followed by the sudden appearance of dirty clouds of black smoke around the German airplane. Only a few rounds later, to the probable surprise of both gunners and aviators, the airplane began to fall from the sky. It spiraled down, finally crashing to the ground in the middle of no man's land. The aviators, having had the good fortune to survive the crash, scrambled out of the wreck and scampered away into the German trenches. That night, French infantry patrols ventured into the 500-meter-wide patch of ground to strip the airplane of machine guns and instruments. Kindly, they brought back a piece of the undercarriage as a souvenir for the Americans.

Capt. E. A. Mellon, the battery commander, immediately reported his success to A.A. Service Headquarters, where the staff became quite excited about it because Mellon's kill was the first airplane ever to fall to American antiaircraft guns. Gen. Shipton was delighted with the success, particularly since it confirmed the efficacy of his training methods, and trumpeted the news of the victory to everyone who would listen. His most enduring announcement was the one he dispatched to the home of the Coast Artillery Corps, Fort Monroe. He wrote to the Commandant, Col. F. K. Fergusson, jubilantly telling him all of the details of the first combat success of the Coast Artillery's new Service. He also sent physical confirmation in the form of a parcel containing Mellon's souvenir. Fergusson framed both letter and airplane fragment and hung them in the Fort Monroe Officers' Club, where they remained on display for many years.[1]

The 2d A.A. Battery was unfortunately not deployed as an American unit at the time, but was finishing its statutory period of training at the front, in this instance by briefly taking over the two semi-fixed 75-mm guns of the French 197th Battery in the II French Army. Nonetheless, American gunners had finally drawn blood, culminating a year of planning and preparation and beginning a short period of combat duty.

The active service of the new A.A. arm encompassed slightly more than seven months, extending from late March 1918, when the 1st A.A. Battalion moved to the front for its final week of training, to the last days of the war. During that time only seven battalions or battalion-sized organizations, plus a few separate batteries, actually were assigned to antiaircraft duties. The continuing shortage of equipment kept the remainder of the A.A. troops, some twelve battalions, waiting in the wings, even though most of them saw some combat duty to the extent that they completed their stint of training with front-line batteries.

The usual measure of success for those units that were deployed to full-time duty was the number of airplanes shot down. That was generally true even at A.A. Service Headquarters, where unusually successful units were lionized, in spite of the commander's and staff's understanding of the wider mission of the antiaircraft defenses. Human nature seems to demand clear yardsticks, and the "ace" mentality of the flying services appears to have imposed itself upon the Antiaircraft Service as well.

The natural competitiveness which was the inescapable consequence of even so tacit a device to gauge efficiency demanded some regulation. Furthermore, the Allies were likely to raise their eyebrows at American claims of antiaircraft victories unless those claims were thoroughly documented. The result was a circumspect set of rules to govern the award of official credit to units for enemy aircraft brought down. Col. Jay Hopkins stipulated that

> 1. All Enemy aircraft which, as the result of fire by Antiaircraft units, land or fall within our lines will be considered as having been brought down. All enemy aircraft destroyed within enemy territory as a result of fire by Antiaircraft units will likewise be considered as having been brought down. Enemy aircraft forced to land on enemy territory as a result of fire by Antiaircraft units, and which make normal landings, will not be considered as having been brought down.
>
> 2. In order that official credit may be given for enemy aircraft brought down, one or more written confirmations in addition to the reports of the unit concerned must be furnished; preferably from witnesses in the Antiaircraft or Air Services.

> 3. In special cases where destruction of enemy aircraft cannot be confirmed, except by evidence of those interested, the destruction may be confirmed at the discretion of the Chief of Antiaircraft Service . . . .
>
> 4. Enemy aircraft brought down and confirmed will be credited to the battery receiving the confirmation and to the officer commanding that particular fire.[2]

The details such a system required admitted of very few overstatements. One independent report submitted by a Capt. Nodet, Chief of II French Army A.A.A., related that Lt. Claire A. P. Duffie's Battery B of the 2d A.A. Battalion, serving with the French Demi-Fixe Section No. 57, shot down a Fokker biplane at 5:40 p.m. on 24 September 1918. In further amplification, he wrote that the airplane was part of a "squadrilla" of six Fokkers flying parallel to the front at an altitude of 2,000 meters, some 7,400 meters away. Duffie's men fired ten rounds of shrapnel; the airplane "dived northwards then after an abnormal curve, fell."[3] A similar memorandum was equally specific, reporting an astonishing shot in which an American battery, firing at night *entirely by sound,* scored a direct hit on a German A.E.G. C.IV bi-motor bomber on 18 September 1918.[4] Such a uniformly high standard of documentation, rigidly adhered to, prevented excessive claims from being submitted.

The other side of the coin revealed the frustration of the units at the fussy confirmation policy of the headquarters. In late November 1918, for example, Col. Jay Hopkins wrote to Col. George Perkins in Second Army to question whether enough evidence existed to award victories claimed by the 1st A.A. M.G. Battalion. He required further details, and in reply received a spiky minute from Perkins which allowed that "it seems apparent that it is beyond the power of this organization to get more complete and accurate information concerning these planes."[5]

In effect, Perkins invited his Chief to take it or leave it, but in either case to leave him alone. Hopkins' concerns were not entirely groundless, if one accepts the circumstantial evidence of prior memoranda issued to make the basis for claims more stringent. He informed the 1st A.A. M.G. Battalion's commander, through the A.A. Service of Second Army, that "when affidavits are made by enlisted men, they should be sworn before Summary Court," and further demanded that planes shot down had to be designated by name and type wherever possible.[6]

Even in view of the periodic animosities to which its severity may have given rise, the Headquarters diligence in sorting out the wheat of confirmed kills from the chaff of wishful thinking maintained the respectability of the Service and safeguarded its genuine accomplishments. The Americans shot down more airplanes with fewer rounds of ammunition for a given period of time than any other antiaircraft service, friend or foe. That conclusion was never questioned, during or after the war, and rested in large part on the rigor with which each claim was investigated before credit was awarded. The point of it all, from the perspective of the A.A. Service staff, was that such a rate of success absolutely confirmed the correctness of the gunnery techniques and tactical doctrine they adopted.

The A.A. artillery batteries shot down a total of seventeen German airplanes in less than three months, using 10,275 rounds of 75-mm ammunition in the process.[7] Their average of one airplane shot down for every 605 rounds of ammunition fired was a "phenomenal record," in the words of the Headquarters, far superior to that of any ally.[8] Only those batteries stationed at the front shared in the kills, for reasons of opportunity and adequacy of weaponry, but the rest of the A.A. Service could bask in the warm glow of reflected glory. Five batteries were responsible for the record.

Unit	Time in the Line	Victories	Shots Fired[9]
5th A.A. Battery	25 Aug-30 Oct (37 days)	1	520
Btry A, 1st A.A. Bn.	22 Aug-11 Nov (82 days)	2	2116
Btry B, 1st A.A. Bn.	17 Jul-11 Nov (118 days)	9	5092
Btry A, 2d A.A. Bn.	11 Sep-11 Nov (62 days)	3	1028
Btry B, 2d A.A. Bn.	11 Sep-31 Oct (51 days)	2	1517

The antiaircraft machine gun battalions enjoyed an even more impressive record. Only the 1st and 2d Battalions were involved, the remaining five battalions being still in training or awaiting equipment. Over a period of three months the aggressive machine gunners of those two battalions surpassed the best Allied records for antiaircraft machine gun units, just as their brothers of the artillery had done. Using 25,115 bullets, they shot down 41 German airplanes, or one airplane per 5,500 shots.[10] By way of comparison, the average number of airplanes shot down on the British front per month by machine guns was two. The two battalions shared the honors fairly evenly.

Unit	Time in the Line	Victories[11]
1st A.A. M.G. Bn.	1 August-November 11	24
Company A	6 Sep-11 Nov (67 days)	(2)
Company B	1 Aug-11 Nov (72 days)	(5)
Company C	1 Aug-11 Nov (72 days)	(9)
Company D	1 Aug-11 Nov (72 days)	(8)
2d A.A. M.G. Bn.	2 September-November 11	17
Company A	6 Sep-11 Nov (67 days)	(5)
Company B	13 Oct-11 Nov (29 days)	(4)
Company C	4 Oct-11 Nov (38 days)	(7)
Company D	4 Oct-11 Nov (38 days)	(1)

The total number of airplanes shot down by the A.A. Service exceeded the conservative "official total" of 58, too. That figure did not include aircraft downed by American troops serving on foreign equipment or with foreign units. The 2d A.A. Battery was therefore not credited with an official victory, although it shot down the first airplane for the Service. Several batteries were in that situation, their kills being credited to the French. In a similar manner, the aircraft shot down by units of the 56th Engineers did not appear in the official total of the A.A. Service, although they were cited in its reports. Lieut. H. R. Davis, commanding the 20th A.A. Searchlight Platoon of Company D, 56th Engineers, was not allowed credit for the German airplane his men shot down with machine guns on 29 October 1918. His was not the only such case, but he was fortunate enough for his at least to have been mentioned in official correspondence. Capt. Alvin Smith's Battery A, 1st A.A. Battalion, was likewise a victim of A.A. Service caution. On 4 September the battery hit a Fokker then attacking an observation balloon. The damaged plane turned toward its own lines, descending rapidly out of control but coming to earth behind German lines in an area masked from observation by trees. There was no doubt in the minds of the many witnesses that the German had been shot down, but A.A. Service received no official verifications from the French and refused confirmation.[12]

In terms of the most simplistic criterion by which success could be measured, the young, inexperienced, and largely nonprofessional A.A. Service was the best organization of its type to fight in the war.[13] The statistical summary of antiaircraft kills showed that the Americans were unusually accurate, with a rate of downings in excess of those of any other service. Battery B of the 1st A.A. Battalion was extraordinarily successful, ranking well above its sister batteries. For the time it was in action, just under four months, Battery B was arguably the finest antiaircraft artillery unit in France. Its record of nine airplanes in 118 days, or one kill every twelve days, compared very favorably with the performance of the Allied batteries. The best records available indicate that the most airplanes shot down by any single Allied unit between 1914 and 1918 was seventeen, over a much longer period of time.[14]

But kills were not everything, as both Chiefs of A.A. Service repeatedly pointed out. They were one measure of success among several such measures. Of greater importance to the A.E.F. was the efficiency with which antiaircraft gunners protected its units and facilities from German aviation. Of greater importance to the Army at large was the battlefield experience which acted to confirm or modify the doctrine the Service had adopted.

The A.E.F., like all armies of its day, was burdened with a great deal of cumbersome impedimenta in its rear areas. The unpalatable fact, however, was that the army could not survive without its expensive and extensive support facilities. Airfields, ordnance depots, supply points, rail heads, transportation centres, artillery parks, hospitals, troop cantonments, and headquarters were necessary to keep the troops at the front in action. By the same token, such facilities were large and difficult to conceal, and that meant that the rear area was richly provided with targets for German aviators. One task of the A.A. Service was therefore the defense of those headquarters and Services of Supply installations.[15]

As the A.E.F. grew in strength, its various commanders began to realize the danger of attack from the air. Requests poured in from all sides asking the A.A. Service to defend all sorts of facilities, even including sawmills.[16] Among the most insistent of the demands were those from Brig. Gen. Benjamin Foulois, Chief of the Air Service. He wanted protection for all of his airfields, especially Orly, he wanted it right away, and he was prepared to write sharp letters until he got it.[17]

A pattern eventually emerged from all of the requests. Everyone in France wanted antiaircraft protection for his area, preferably immediately. Once the antiaircraft units arrived, local commanders wanted complete administrative authority over them but did not desire to accept the correlative responsibility for air defense. Finally, they saw no requirement to supply living quarters, subsistence, equipment and supplies, or transportation for the antiaircraft units.[18] In order to eliminate potential squabbles among his subordinates and to make the best use of his limited antiaircraft capability, Gen. Pershing took the matter into his own hands. The G-3 of the A.E.F. published his twofold solution; first, he established a command structure for the A.A. Defenses which left them under the control of their own headquarters, but which required local commanders to support them; second, the GHQ itself would set the priority for the erection of A.A. Defenses.[19]

The Defense Priority List as established by the GHQ grouped the most important rear area installations into nine defenses and gave the A.A. Service the job of implementing that list. The areas to be defended were all fairly near the Zone of the Advance, or front lines:

Defended Area	Type Facility
1) Is-sur-Tille	A.E.F. Regulating Station, Ordnance Depot #1
2) Chaumont & Jonchery	Ammunition Advanced Depot #4, hospitals, General Headquarters, A.E.F.
3) Colombey-les-Belles	Air Depot
4) Ourches	Aerodrome
5) Langres	A.E.F. hospital, Army Schools, Motor Repair Park
6) Gondrecourt & Amanty	1st Corps Artillery School, Divisional Headquarters, Flying Grounds, Railroad yards
7) Neufchateau	Depot, Railroad yards, Divisional and Corps headquarters
8) Vittel & Contrexeville	Hospital complex
9) Haussimont	Headquarters, Railway Artillery[20] Reserve, Maintenance Park

The A.A. Service convened boards of officers to study each area it was required to protect and submit plans for the development of the defenses.[21] The lavish scale of the antiaircraft plans submitted by the boards of officers and approved by the A.A. Service and the GHQ is indicative of the optimism of all parties concerned that the French would be generous with equipment. The defense plan for Gondrecourt and Amanty is an excellent case in point. Although well down on the priority list, the flying grounds and railroad yards there were to be well protected. The plan called for six semi-fixed batteries, each with an attached antiaircraft machine gun section, three additional antiaircraft machine gun batteries, ten barrage balloons, nineteen searchlights (four platoons), 23 sound locators, and, in an advance position, one more semi-fixed battery with three searchlights and one set of sound locators.[22] Defense plans for the other areas were equally generous.[23]

The defensive formula that emerged from the planning process was that guns and searchlights were needed in roughly equal numbers, and the one company of antiaircraft machine guns was needed for each sector of four gun batteries. The total troop requirement for the nine defended areas under that scheme amounted to 24 A.A. gun sectors (192 guns), six antiaircraft machine gun battalions, and one and one-half regiments (15 companies, 225 lights) of searchlights.[24] Of course, the A.A. Service had nowhere near that number of men or quantity of equipment, so something altogether more modest had to be attempted instead.

The first Antiaircraft Defense Shipton installed was at Is-sur-Tille, an important installation which, being not terribly far behind the lines, was first on the Defense Priority List because of its vulnerability.[25] The antiaircraft plan for Is-sur-Tille called for six guns and the appropriate quantities of machine guns and searchlights,[26] but the manning of the defense began with only one battery. The 1st, 2d, 3d, and 4th Antiaircraft Batteries finished their training at the A.A.A. School on 2 March 1918. While the 2d, 3d, and 4th A.A. Batteries proceeded to the French front for their period of front line training, the 1st A.A. Battery was sent directly to Is-sur-Tille. The battery commander, 1st Lt. Herbert K. Webb, C.A.R.C., one other officer and 66 men began upon their arrival to implement orders to "initiate the installations necessary for the defense of Is-sur-Tille."[27] The 2d, 3d, and 4th A.A. Batteries were ordered to join the 1st A.A. Battery in the defense as soon as their training was finished. The other three batteries were expected to arrive at Is-sur-Tille by about 15 May, and the local commander was directed to arrange barracks for them, although the new troops would supply the labor for construction of their quarters.[28]

The four batteries were grouped together under the 8th Antiaircraft Sector, which commanded the Antiaircraft Defenses.[29] As a reward for his hard work in setting up the A.A. Service, Capt. Glenn P. Anderson was finally allowed to leave his desk at the headquarters for a brief tour as commander of the 8th A.A. Sector. He assumed his duties at Is-sur-Tille on 25 May 1918 and kept the job until 10 June, when his expertise was demanded back at headquarters, where he became Director of the Artillery Section of the A.A.A. School.[30] He was succeeded in command by Lt. Col. Robert W. Collins, who had led the 1st A.A. Battalion from December 1917 through the spring of 1918. Collins was in command only until the end of June, when he was whisked away to command the A.A.A. School and, finally, the A.A. Service of First Army.[31] The officer who commanded the 8th Sector from July through the end of the war was Charles N. Wilson, a regular who had recently commanded the Sector's 2nd A.A. Battery and was promoted to temporary Major in June 1918.[32]

Collins and Anderson experienced all of the frustrations the job had to offer, for the batteries of the 8th A.A. Sector were not armed during their command tenures. Only twelve of the American-built improvised gun mounts were available in France in early May, but most of that small number were mounted at Is-sur-Tille, together with two guns.[33] Upon opening the crates containing the gun mounts, however, Lt. Herbert Webb's men found that they were useless because "there are no Base Rings or Traversing Racks included in same."[34] Other critical equipment was missing from some of the remaining mounts, including recuperators, recoil hydraulic fluid, and traversing gear.[35] The deficiencies were ultimately made good, but Shipton's report on 4 May 1918 to the First Army that the 1st A.A. Battery was emplaced with two 75-mm guns at Is-sur-Tille was clearly premature.[36]

Shortly after he assumed command, Capt. Anderson named the four batteries at Is-sur-Tille, in accordance with established Coast Artillery practice. The names he selected for the batteries, however, were those of serving officers, whereas the normal practice was to name batteries only to honor deceased officers and men who had distinguished themselves.

1st Battery — Battery Rose (for Lt. Col. Rose, Ord. Dept., designer of the Improvised Gun Mount)

2nd Battery — Battery Hopkins (for Lt. Col. Hopkins, then Director of the A.A.A. School)

3rd Battery — Battery Coe (for Maj. Gen. Coe, Chief of Coast Artillery)

4th Battery — Battery Shipton (for Brig. Gen. Shipton, Chief of A.A. Service)

Anderson's choices could easily have been construed as an attempt to curry favor with his superiors, and Gen. Shipton promptly disapproved not only Anderson's battery names, but the whole practice of naming batteries in the A.E.F.[37]

By the middle of June all four batteries were present for duty, but still only the 1st A.A. Battery had guns.[38] The situation had improved but little by the second week of July. At that time all guns seem to have been mounted and searchlights were being installed, but the Sector had only two sets of fire control equipment, some of its gun mounts were held up for want of raw materials, and "the French . . . refused to furnish additional ammunition . . . and that ammunition from the United States is being held up pending the development of a suitable fuze."[39]

The first date on which the record clearly shows that all eight guns at Is-sur-Tille were operational was 28 August 1918, when all reported that they had two 75-mm guns, M1897 on improvised A.A. mounts, ready for duty.[40]

The importance of Is-sur-Tille notwithstanding, the Germans never attempted to bomb it, and the four batteries and four searchlight platoons stationed there maintained a fruitless vigil.[41] None of the four batteries were awarded credit for battle participation, either,[42]and the official record goes so far in one case as to say that "there is nothing in the records of the 3rd Antiaircraft Battery to indicate that at any time . . . it was firing, under orders to fire, or subjected to the fire of the enemy."[43] The war diaries of the 8th A.A. Sector confirm the inactivity of its batteries. All record no hostile air activity, no targets, no action at all, and refer only to increasing problems with influenza in October 1918.[44] Is-sur-Tille was evidently a quiet place to be assigned, at least for most of the time.

A lot of problems which were to recur in other A.A. Defenses cropped up first at Is-sur-Tille, in many ways a laboratory for the A.A. Service. The 8th A.A. Sector had the dubious distinction of being the first to demonstrate the problems of aircraft recognition. The A.A.A. School was sensitive to the potential for disaster and taught that

> In the first place the aeroplane must be identified as an enemy plane. Friendly planes are prohibited from flying over small areas, but there is always the possibility that a friendly plane will become lost in the night and not know that he is over such an area, so that if we relied on that alone it would result (and has resulted) in fire being opened on an allied plane.[45]

The 4th A.A. Battery gave an eloquent example of how not to select targets on 15 July 1918. The battery commander was a firebrand reserve officer, Capt. R. R. Robertson. When a distant post observer reported to him that "a plane is approaching" that day, Robertson interpreted him as having said that "a German plane is approaching," and opened fire at it. Unfortunately for him, the airplane was friendly, and its pilot prudently betook himself elsewhere while the gunners sorted the situation out. Robertson duly reported the firing to the Sector commander, Capt. Charles Wilson, who immediately took him to task for shooting too quickly. No doubt anticipating the grilling he in his turn would receive at the hands of the A.A. Service headquarters, Wilson did not spare the lash when reprimanding Robertson:

> You are, of course, aware now that the serious catastrophe of bringing down a friendly plane was only averted by the error in your shots. The fact that the approach of friendly planes is of almost daily occurrence in this area and the presence of hostile planes is almost unknown, should cause a report of hostile activity to be well considered and the identity of planes to be established beyond doubt. This may demand that you withhold fire until the identification marks can be seen with glasses. Also the plane in question was flying slowly and at the low altitude of about 1500 meters, which would not seem to be the action of an intelligent enemy.[46]

Robertson attempted to pass the firing off lightly, however, and stubbornly maintained that "I am not yet sure that the plane fired at was not an enemy plane and do not see that there will ever by any absolute assurance that it was a friendly plane."[47]

His reply enraged Wilson, who forwarded the whole set of correspondence to the A.A. Service headquarters, asking that Robertson be relieved from command "and assigned to some work that will not require such great responsibility in the exercise of judgment." Wilson explained the necessity for Robertson's relief and reassignment:

> Capt. Robertson displays dogmatism, disregard to the consensus opinion of others, immunity from instruction, and even goes so far as to indicate that he cannot be guided by identification marks, due to the probability of the enemy disguising the plane.[48]

After pondering the problem for a while, the headquarters did reassign Robertson, but, curiously enough, chose to promote him and assign him to command an A.A. Sector of his own.[49] One might conjecture that Col. Hopkins suspected that the heart of the matter was a rivalry between two men who had once served together as battery commanders. In any case, more would be heard of Robertson, and Is-sur-Tille was doubtless a duller place for his leaving it.

As a result of his embarassment, Maj. Wilson suggested a means of insuring that his units would not fire at friendly aircraft. He proposed the designation of a restricted area on a radius of twenty kilometers from Is-sur-Tille. All friendly airplanes would be prohibited from flying in that zone at night, and at any altitude greater than 2,000 meters by day. Wilson's idea made good sense, but attracted a mountain of critical comments, particularly from Air Service officers. Eventually the G-3 of the A.E.F. disapproved the suggestion, and the problem of aircraft recognition trundled along as before, no nearer a solution.[50]

All of the lessons learned in setting up the first rear area antiaircraft defense, including the painful lessons, were applied when subsequent locations received A.A. protection. The consequence was that the process of establishing the defenses became simpler and more a matter of routine. The supply of equipment slowly improved. By the end of June, eight complete improvised gun mounts had been turned over to the troops at Is-sur-Tille and enough were available to set up another A.A. Sector.[51] Therefore the A.A. Service was ready to establish the next Antiaircraft Defense, this one at the G.H.Q. of the A.E.F.

The plan which Gen. Pershing's staff wished for the A.A. Service to implement at Chaumont required four batteries of guns, four batteries and an additional four sections of machine guns, twelve searchlights and sixteen sound locators.[52] Enough equipment was on hand to make a start, but there were not the men to staff the units the defense would require. Eventually, personnel were made available from the 54th Artillery at Mailly-le-Camp to form the 1st, 2d, and 3d Provisional Antiaircraft Batteries.[53] The provisional batteries were organized under the 9th Antiaircraft Sector, which commanded the entire defense, and arrived at Chaumont on 23 July 1918 after a brief period of training at Fort de Stains.[54]

As at Is-sur-Tille, the defensive plans underwent considerable modification because of the limited supply of equipment. At Chaumont the defenses were limited to four gun batteries of two guns each. Machine gun units were never provided, defensive balloons were not approved, and searchlights were not delivered because that could not be done "without sacrificing installation at the front."[55] The G.H.Q. was not completely undefended while the 9th A.A. Sector was being formed, however. A French battery remained at Chaumont until September. When it was recalled, the A.A. Service replaced it with the 10th A.A. Battery from Fort de Stains.[56]

The commanding officer of the new 9th Antiaircraft Sector was Capt. R. R. Robertson, who had recently caused such a stir at Is-sur-Tille. Once the man who harassed defense commanders at Is-sur-Tille, Robertson himself became the object of harassment of Chaumont. His situation there was somewhat more difficult than Capt. Charles Wilson's at Is-sur-Tille, because even less materiel was available to him. Granted that guns on the improvised mounts were not very accurate, still it would have been nice to have had some fire control equipment for them. But Robertson's units fired by guess, at least through September, because each battery had only two guns and mounts and two fuze setters—no tracking and aiming equipment at all.[57]

There was even a problem in providing ammunition for the batteries. The French were unable to provide any quantity of 75-mm shells at the time, and the American supply was, as always, pending.[58] Col. Jay Hopkins tried to speed the delivery of ammunition, but the Ordnance Department moved at its own pace. Eventually he secured 8,000 rounds for Is-sur-Tille, but by late August was still trying to scrape up a delivery for Chaumont.[59] In the meantime, Capt. Robertson dealt with the problem directly. He went to the French battery stationed at Chaumont and borrowed 297 rounds of 75-mm High Explosive ammunition, and distributed eleven cases to each battery.[60] That was not very much when a single gun could use twenty rounds per minute, but at least his guns could make a showing if the Germans appeared.

The 9th A.A. Sector did have the opportunity, unlike the 8th A.A. Sector, to shoot at German airplanes. Although no major night bombing raids on Chaumont were attempted, the Germans overflew the town frequently.[61] The 9th A.A. Sector stood many "alerts," at one time as many as nine in one day, to defend the G.H.Q. from day bombers, reconnaissance aircraft, and airplanes dropping propaganda leaflets. The latter were particularly difficult cases, since the Germans were in the habit of disguising their aircraft with French national and squadron markings for such missions. The batteries were sited atop the hills around Chaumont and were centrally directed so that all guns fired on every target. The Sector did not shoot down any German airplanes, but did prevent the bombing of the Headquarters, hospital, ammunition dump, and town.[62]

In September Robertson was reassigned to command the new Antiaircraft Defense of Colombey-les-Belles, the third location on the Defense Priority List. He turned over command at Chaumont to Maj. Barrington L. Flanigen[63] and moved on to take over the 10th A.A. Sector, then being organized to construct the new defenses. When its antiaircraft defense was planned, Colombey-les-Belles was considered an advanced post of Neufchateau. It was important enough in its own right to merit defense,however, because of its railway yards and flying grounds assigned to the 1st Air Depot. The area's attractiveness as a target was further enhanced by its proximity to the airfields of the French, British and Italian forces at nearby Ochey. The area was flat, and the hangars stood out clearly in the open field despite the most diligent attempts at camouflage. The storehouses, repair shops, and barracks were at less of a risk because they were well camouflaged and concealed in woods and thickets, as well as being built at some distance from the hangars and spread out over a considerable area.[64]

The recommended defensive measures involved three A.A. gun batteries, each with an attached machine gun section, three A.A. machine gun batteries, eight searchlights, nine balloons, and eleven sound locators.[65] The units intended to man the defenses were still in training at the A.A.A. School until late September,[66] but Col. Hopkins was prepared to provide some protection for the area just as soon as the men were properly qualified. He allotted to the 10th Antiaircraft Sector the 6th, 7th, 8th, and 9th Antiaircraft Batteries, and on 16 September waived the normal period of training at the front for the 9th A.A. Battery so that it could establish some sort of defense as soon as possible.[67]

On the same date, Hopkins acknowledged receipt of permission to shift six antiaircraft guns and improvised mounts from Ourches to the more vulnerable Colombey-les-Belles, so that the 9th A.A. Battery would have guns to man and so that it could provide positions so that the other units could, upon arrival, assume their duties with no delay.[68] The "urgent need for antiaircraft defense at Colombey-les-Belles" so impressed him that Hopkins even asked that Company B of the 2nd Antiaircraft Machine Gun Battalion be detached and sent there, while the rest of the battalion went to the front.[69] Finally, he took steps to retrieve from French control as soon as possible the 6th and 8th A.A. Batteries. As a result of his representations, the Chief of Staff of the A.E.F. wrote to the French Military Mission at Chaumont, saying:

> It is desired to utilize the services of the 6th and 8th Antiaircraft batteries in the defense of Colombey-les-Belles. These units are now serving with your 7th and 8th Armies respectively. The necessity for the employment of these units is urgent, and it will be greatly appreciated if you will secure their release at the earliest practical date . . . .[70]

The result of all of Hopkins' frenetic letter-writing was that Capt. Robertson quickly received the leading elements of the 10th A.A. Sector; the 9th A.A. Battery arrived at Colombey-les-Belles on 23 September 1918,[71] to join Company B, 2d A.A. M.G. Battalion, which had arrived there on 18 September.[72] The 6th and 8th A.A. Batteries arrived very shortly thereafter, each having sampled the front line duty denied the 9th A.A. Battery. The 6th A.A. Battery had served with the VII French Army from 28 August through 27 September and received battle credit for the Defensive Sector (Lorraine), in the course of which duty it fired some 350 rounds but shot down no Germans. The 6th Battery was previously assigned to the VIII French Army at Luneville between 28 August and 24 September, where it expended 1,019 rounds of ammunition, also without getting any kills. It reported to the 10th A.A. Sector on 28 September.[74]

Once the three gun batteries were fully operational, Company B of the 2d A.A. M.G. Battalion was returned to the duty for which it was intended, on 13 October. When it left, Col. Hopkins replaced the machine gunners with the 7th A.A. Battery.[75] The 7th A.A. Battery had been around; its men were veterans of the St. Mihiel and Meuse-Argonne campaigns and had served at the front with the First U.S. Army from 8 September through 11 October. The battery also had no luck with German airplanes, firing 540 rounds without shooting any down.[76] Together with one platoon of searchlights from Company A, 56th Engineers, the battery completed the defenses of Colombey-les-Belles when it arrived there on 11 October 1918.

Robertson was fortunate in having two of the well-designed French demi-fixe 75-mm guns in addition to six of the execrable U.S. improvised mountings.[77] That meant that at least twenty-five percent of his guns could shoot accurately, and they were not long in being given the opportunity to do so. On 26 September he had only three guns mounted,[78] and on 10 October, when the first air raid took place, still only the 9th A.A. Battery was then in commission. On that day two Rumpler aircraft flew over Colombey-les-Belles at some 5,000 meters altitude. The 9th A.A. Battery opened fire on them, shooting twenty-six rounds before the Germans were out of range.[79]

The area remained quiet for almost three weeks, a sufficient interval for Robertson to manage to get all of his batteries operational. At six in the evening of 28 October, another raid gave the rest of the batteries a chance at the Germans. A bomber which, according to Robertson, sounded like a British Handley-Page machine, dropped seven fifty-kilogram bombs on the aerodrome. The 7th, 8th, and 9th A.A. Batteries tried a few shots, but with no result. An hour and a quarter later another plane flew over. It showed lights, but because it refused to reply to recognition signals, Robertson ordered his batteries to fire. The pilot immediately dropped an identification flare of the proper color and the firing was hastily stopped.[80]

It appeared to Robertson that his long-standing concern about enemy aircraft masquerading as friendlies was vindicated, and he wrote a report, echoed by Lt. Col. John C. Gotwals of the 56th Engineers, warning of German use of a new British Handley-Page bomber.[81] The commander of the 1st Air Depot did not agree, however. Robertson was never noted for his tact, and had evidently long disregarded instructions from the post commander, Lt. Col. F. M. Jones of the Air Service. Jones, like most local commanders, believed that he commanded his air defenses as well as his post, and Robertson was equally confident that he answered only to Col. Jay Hopkins. Robertson therefore casually refused to attend Jones' staff meetings. The aftermath of the 10th A.A. Sector's firing on 28 October was therefore a verbal fireworks display in which Jones was probably more incensed about Robertson's independence than the possibility that he had fired at an Allied airplane. Jones vented his spleen on Lt. Gilson, one of Robertson's officers:

> "Come on out here, I want to talk to you. What do you mean by firing on Allied planes last night? You let this Boche get in here and drop his bombs and didn't fire a shot till he was clear over in Nancy. Then after that you wasted a Hell of a lot of ammunition on an English plane. You fellows weren't on the job last night at all. You were asleep and I want you to wake up. See? And what is more, you tell that commanding officer of yours that he is to have an officer down here at these meetings every day. Do you understand?"
>
> Lt. Gilson—"Sir, we have been instructed by our headquarters that it would not be necessary to have an officer at these meetings."
>
> Lt. Col. Jones—"I want you to know that I am running this post and that you are on this post and you can tell that captain of yours that he will either have an officer down here at these meetings or start preparing his defenses for a general court martial, for disobeying orders, and that if he don't get on the job I will get somebody else out there on that post."[82]

Robertson, full of righteous indignation, took his plea to Hopkins, who was once again obliged to pour oil upon the troubled waters. He circularized all local commanders on 4 November to remind them that command of all antiaircraft organizations in the rear areas devolved upon the Chief of Antiaircraft Service, not the local commanders.[83] Hopkins did not attempt to referee the argument about whether the aircraft in question was friendly, and since there is no evidence that a friendly air service made a complaint, perhaps Robertson was for once in the right. In any case, Hopkins must have wearied of his energetic and controversial subordinate by the end of the war.

The final air raid of the war for Colombey-les-Belles came on the evening of 30 October. Four German airplanes appeared between 5:55 and 8:45 p.m., making three separate attacks on the airfield. The Fokkers released flares to aid them in finding targets, and then dropped a total of twenty-two bombs, all without effect. The A.A. batteries were equally ineffective, firing 639 rounds of ammuntion with no apparent result. The real excitement of the evening came during the second attack, when the Germans strafed the 9th A.A. Battery's gun positions in low altitude attacks and the battery personnel defended themselves with machine guns they had mounted around their guns.[84] Col. Jay Hopkins' final judgment upon the efficiency of the 10th A.A. Sector was that "it may be too much to say that this installation saved our air service base at Colombey-les-Belles, but none of the night attacks after this installation were successful."[85]

Such success as American rear area antiaircraft defenses enjoyed owed much to the decision of the A.A. Service to develop its alert system in liaison with the French. The notification procedure relied upon two continuous lines of observer posts which paralleled the front lines from the Channel Coast to Switzerland. Information about the progress of enemy aircraft was passed over an antiaircraft telephone net and enabled those areas which were threatened to prepare themselves for attack. American installations adopted the French practice of extinguishing all lights when warned of an attack, so that an area of 100 kilometers around the observer post reporting the airplane was totally dark.[86] The antiaircraft plan for each area accordingly discussed the necessary telephone connections in some detail. At Colombey-les-Belles, for example, direct lines were planned with the commander of the Antiaircraft Defenses of Neufchateau; with the French net centrals at Toul, in their Army Area, and at Flavigny, in their VIII Army area; with the

British aerodrome at Ochey; with the British defense at Vezelise; with the commander of the Antiaircraft Defenses at Amanty; and with the observer net.[87]

The intention was of course to link together all of the American antiaircraft defenses, and that turned out to be rather a small task, for only the three at Is-sur-Tille, Chaumont, and Colombey-les-Belles were in action before the end of the war.[88] Ordnance property was assembled and delivered to the other locations, and some guns were mounted in accordance with the various antiaircraft plans. At Langres, for instance, six guns were mounted, and at least one was mounted at Haussimont.[89] Troop units were designated to man the proposed defenses, but only one more Sector was ordered to move from the A.A.A. School to a field location.

The 11th Antiaircraft Sector, comprising the 10th, 11th, and 12th Antiaircraft Batteries, was alerted to move to Ourches-Sorcy at the end of September to protect the aerodrome and railroad yards there.[90] The Antiaircraft Defenses of Ourches, however, were not completed by 11 November. The remainder of the defenses were never begun, although a considerable amount of equipment had been accumulated by that time.[91]

It was a bitter pill to swallow, particularly after all of the work that had been done, but Col. Hopkins finally was obliged to inform the G.H.Q. that American troops could not take over the antiaircraft defense of the American sector. The problem was equipment, rather than trained manpower, but that did not make the situation any more palatable for the Chief of A.A. Service. The gun mounts sent to him from the United States were suitable only for rear area defenses,[92] and only Battery B of the 1st A.A. Battalion was equipped with American property—two 75-mm auto-cannon purchased from the French.[93] Aside from that, American units which were ready for duty at the front had no materiel of their own. Eventually the G.H.Q. was obliged to write yet another humiliated letter to the French authorities asking for help:

> On account of the lack of Antiaircraft Artillery materiel, the American Expeditionary Force is unable to take over the Antiaircraft defenses of the area in which our 1st Army is operating. It would be most gratifying to the Commander-in-Chief if the French authorities continue these defenses until such time as the American materiel is available.[94]

In response, the French turned over to American control a considerable number of units along the Meuse, but retained command of the fixed A.A. armament in the U.S. sector. Around thirty-five guns manned by French troops were turned over to First Army, along with their crews.[95]

Eventually, Col. Robert W. Collins, the Chief of A.A. Service for First Army, reached an agreement with the Frenchmen who had been placed under his command. The French batteries were as a rule lacking in personnel and the Americans who came to them for instruction were welcomed as reliefs and additional manning. That arrangement was regularized when fully-trained American units were assigned to First Army. Since the French could not give up the equipment upon which American units were training, the easiest solution was to leave the troops with the units at which they had completed their training. In all cases American troops had equal opportunity to man the guns, and in many cases the French consolidated their own personnel so that Americans were in effect in complete possession of their guns. That was the case with H&S Co., 1st A.A. Battalion, which served French guns from beginning to end, usually under French Sector control. It shot down no Germans, but served so steadfastly in an exposed and dangerous area that the French GHQ awarded the Company the Croix de Guerre with Bronze Star.[96]

Battery A, 1st A.A. Battalion, for example, conducted its front-line training in May 1918 with the French 32e Section Auto-Canon of French VIII Army. The 32nd Section was one of the French units assigned to First Army, where Battery A, 1st A.A. Battalion was also assigned, and the relationship between the two units continued. From 2 July through 15 September the battery remained with the 32e Section Auto-Canon of VIII French Army, providing A.A. defenses of the front line sector near Einville. In September it was attached to a battery of trailer-mounted 75s and a semi-fixed battery at St. Genevieve and Belrupt. Battery A remained with those units, the 2e Section de 75s sur Remorque and the 56e Section Demi-Fixe, until the end of the war. It fired actively every day there was good flying weather, but with little success, having one claim confirmed and one denied in all of October. Capt. Alvin Smith spoke of Battery A in such terms as to make clear that it was entirely an American unit, not sharing its guns with anyone.[97] It appears that similar arrangements were made by all of the units of 1st and 2d A.A. Battalions, so that they effectively, if not actually, had guns of their own.

The total American antiaircraft force available to the two armies of the A.E.F. was two antiaircraft artillery battalions (ten batteries), three separate antiaircraft artillery batteries, two antiaircraft machine gun battalions (eight companies), and a varying number of searchlight platoons usually amounting to four companies. The A.A. units were active on the American front during the St. Mihiel offensive and in all subsequent operations.[98] All of the units were assigned to First Army until Second Army was organized, at which time they were divided between the two.[99]

The basic task of all A.A. troops was the protection of front line units, particularly after the Germans stepped up the scale of their trench strafing, but one of the key ideas remained the protection of certain critical assets. Forward supply dumps, battle headquarters, communications centers and field artillery batteries were important, but the focus of attention was the observation balloons. They were always targets for German aviators, while the other sites simply did not receive the enemy's attention so dependably.

An early communication from Lt. Gen. Hunter Liggett pointed up the problem with balloons:

> The two balloon companies on duty with the First Army Corps have had a total of four balloons shot down by enemy airplanes. Losses are due entirely to lack of antiaircraft artillery. The corps artillery is greatly handicapped by the lack of balloon observation on which it depends for registration and observation. As long as the enemy continues to down our balloons at will we will not be able to keep the companies supplied with balloons. It is absolutely essential that antiaircraft artillery protection be furnished at once.[100]

One of the chief tasks of the antiaircraft artillery, at least from the point of view of the Army commander, was therefore to protect the eyes of his all-important artillery. At the same time, of course, he expected the A.A. gunners to blind the German artillery by driving off or shooting down his artillery observation machines.

The first battalion to leave for the front was the 1st A.A. Battalion, and it is clear that the batteries were roughly treated from the start. Even during the week of training with the French units, the batteries of the 1st A.A. Battalion were machine-gunned by German planes, shelled, and gassed frequently. Firing an A.A. gun brought on German counter-battery fire as surely as did firing a field gun.[101] Maj. Robert E. M. Goolrick, the battery commander who was shortly to take over the battalion, recommended to the A.A. Service commander that he use only mobile gun batteries at the front, because the Germans fired artillery at them so often. He also asked for two machine guns for each battery, in order to protect them from low-flying aircraft. Finally, he saw that four months in the line was enough, and recommended that battalions be relieved at not longer than 120-day intervals.[102]

The life the men led at the front was anything but easy. The batteries had to be near enough to the lines—between two and five kilometers, on the average—to be useful, and that meant emplacement within easy range of the German artillery. The enemy shelled the A.A. batteries, at times heavily, and just as often gassed them. Capt. Alvin Smith said that his men usually didn't carry all of their gear when serving the guns, especially their cumbersome gas masks. That oversight resulted in twenty-three of them, including Smith, receiving an award of the wound chevron when Battery A of the 1st A.A. Battalion was gassed.[103] When Battery B of that battalion was shelled near Verdun, the "very heavy caliber" of the artillery made such a profound impression upon Goolrick that he felt obliged to write that "the good work that the battery is doing there justifies the danger that they are subject to from enemy shells."[104] The gunners remained exposed to risk, whether gas and artillery, or strafing German pursuit ships, a frequently mentioned complaint.[105]

The soldiers slept where they could—in farmhouses or barns if they were lucky, but just as often in old trenches or in open fields.[106] Very often their stay in the open was purposeless, for aircraft did not venture over the lines in bad weather, and the bulk of American combat duty came in the fall, a time of generally bad weather in Europe.[107] Capt. Mervyn J. Cody, commanding Battery C of the 1st A.A. Battalion, reported in his War Diary for November 1918 that the weather was rainy or overcast and that the guns were not manned for seven and one-half days out of the first eleven days of that month.[108] The time was never wasted, though. When the German air force did not sortie, the batteries used the time to drill with their guns, particularly on balloon barrage, and did routine fatigue duties. On good flying days, reveille was at 3:45 a.m. for the gun crews and at 5:00 a.m. for the rest of the men. Two gun crews stood alerts while a third rested. In order to assure readiness to move, the battery commander inspected his men and their equipment, their quarters, and the unit's vehicles daily. The battery was usually dismissed around 9:15 p.m.—earlier as fall arrived and darkness fell earlier.[109]

The batteries moved often in order to position themselves favorably to protect the advancing American troops. Capt. James Lanagan, commanding Battery B of the 1st A.A. Battalion, once wrote to the Adjutant of the A.A. Service to describe the experience and, at the same time, make an artful plea to have the supply system circumvented in his case:

> My dear Whitman: —
>
> Thank you for your letter of July 11th. We have been following up the Germans, changing position nearly every day. Sleep is a forgotten luxury . . . . Now please don't require us to go thru regular channels, or we will never get the stuff. Can't you rush it direct?[110]

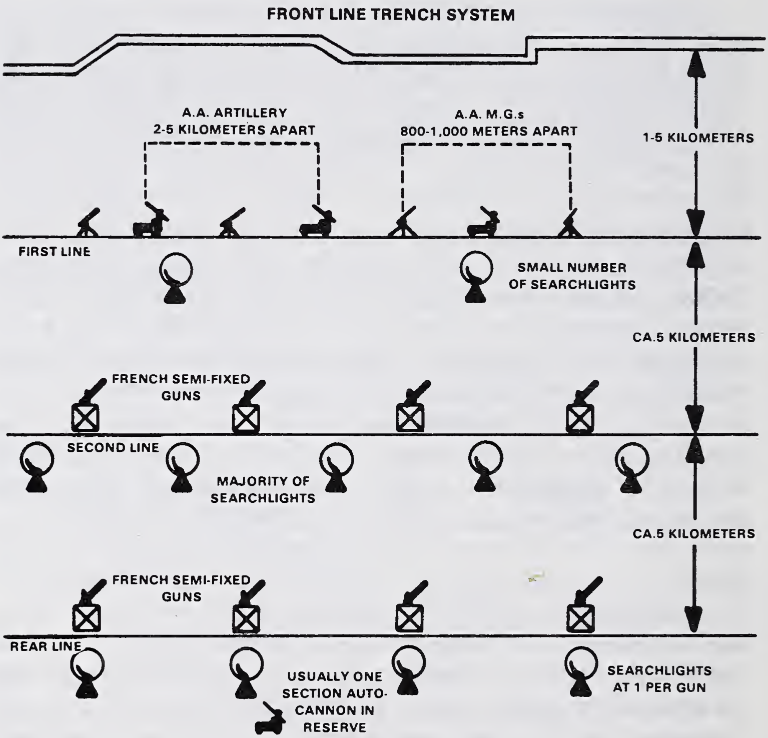
The batteries frequently did move daily, and the stationing reports the battalion commander rendered to his superiors were therefore exceedingly imprecise. On one occasion Maj. Goolrick prefaced an accounting of the locations of his batteries with caveat that "so far as known at present, stations of batteries . . . are as follows."[111]

One reason for the uncertainty was that the batteries were never used together as a battalion, but operated separately instead. Capt. Alvin Smith recalls that Battery A was formed at Fort H. G. Wright, New York, while Battery B was organized at Fort Winfield Scott, California, from that Fort's 10th Company. He never saw the other batteries until he got to France with his own unit, and but rarely thereafter. "Battery B was assigned to First Army just as we were," he remembered, "but we never worked with them or with any of the other batteries." He went on to say that "we hardly ever saw anyone else in the battalion except the battalion commander."[112]

An already confused situation was further muddled by the First Army G-3, who felt free to give assignment orders to the individual batteries.[113] At the same time, the Chief of A.A. Service of the Army was authorized to issue operational orders. It was a wonder that the battalion commander had any idea at all where his guns were located. When Second Army was activated, both A.A. gun battalions happened to have batteries assigned in both armies, an impossible command situation which prompted Col. Robert W. Collins to ask Col. Jay Collins to step in. "How about getting the 1st AA Bn (CAC) together?" he wrote. "The Hq. & Supply Co. has been an orphan for some time and would be much better off in the 1st Army Area. I understand," Collins concluded, "it has had some hard sledding."[114] Collins' pleas notwithstanding, the 1st and 2nd A.A. Battalions came back together only at the Armistice, and their success in operating in such a helter-skilter manner gave weight to the argument that the sector organization, rather than the battalion organization, was most appropriate to such units.

When the front was static, the units were all engaged in point defenses—most notably the defenses of observation balloons. Bitter reproaches flowed from the pens of angered Balloon Wing Commanders every time one of their bloated charges was shot down by German fighters, and the kindest thing that they usually alleged about the antiaircraft units in the area of the balloons was incompetence.[115] When Americans went over to the attack, the battalions had rather more to think about. The antiaircraft defenses of the front line were organized in three traces. The First Line, some two to five kilometers behind the infantry trenches, comprised an integrated defense of auto-cannon antiaircraft artillery, a few searchlights, and antiaircraft machine guns, with each gun site located two to fivekilometers apart. At a variable distance, usually some five kilometers, the Second Line was established. The Second Line consisted of semi-fixed antiaircraft artillery and searchlights, again dispersed at from two to five kilometer intervals. The Rear Line, again some five kilometers behind the Second Line, was composed of semi-fixed guns grouped about key installations, and had attached to it whatever mobile guns could be spared from the first line so that some reinforcements could be available. The general plan was that the auto-cannon in the First Line and the antiaircraft machine gun sections could easily follow up the advance of the attacking troops and keep some sort of antiaircraft protection over them. The Second and Rear lines would then displace forward in stages, maintaining the same relative distances from each other and the First Line. The machine guns were specifically intended to defend rail heads, bridges, highways, and troop concentrations, particularly in the advance.[116]

DEFENSE IN DEPTH; A.A. PROTECTION OF THE AMERICAN FRONT



The more crucial task of protecting the attacking infantry from enemy airplanes was supplemented by the requirement that the gunners also attack German bombers at night as they crossed the front heading for rear areas. It was in that task that the searchlights were intended to come into their own. Never particularly successful up close to the front, they were much more useful after they were withdrawn to the Second Line. Capt. A. W. Bryan of Company C reported that his lights were often attacked, and that it appeared that one plane from each attacking group was detailed for that purpose. His men armed themselves with fourteen captured Maxim machine guns for self defense, but Bryan still believed that the place to stop the bomber was further to the rear. The searchlight "band" which extended behind the front could not be outflanked, and although not of great depth, was expected to be successful in illuminating German night bombers for the guns. When that was found to be only partly successful, the engineers and Air Service came up with an alternate scheme. They had noted that plenty of searchlights were on hand by late October, and had also heard that the British were using searchlights to illuminate bombers for attack *by night fighters* as well as by guns. Since the British were said to be having some success, they thought that Americans should try it too. The plan involved establishing zones in which A.A. guns would not fire at night. Those zones would be protected by searchlights and night pursuit aircraft. The details were worked out jointly by the Commanding Officer of the Night Pursuit Group, the commanders of the various A.A. batteries, and Maj. Tompkins, Searchlight Officer of First Army, under the general direction of Col. Robert Collins.[117] In the event, that didn't work too well either, and the searchlight troops continued to try to improve their equipment. A genuine use of searchlights was found in assisting crippled Allied aircraft in landing at night.

Searchlights could illuminate the landing ground, making it possible for the airplane to see well enough to land. To the frustration of the engineers, their lights were vastly useful benign tools but not very good weapons.[118]

The coordinated tactics of the antiaircraft artillery, machine gun, and searchlight units in the St. Mihiel offensive were crowned with success. The A.A. troops shot down thirteen enemy airplanes and scattered or drove away German pursuit formations within range. That was true both of the high-flying aircraft which were attacked by A.A. artillery, and of the low-flying planes which came within range of the A.A. machine guns. The machine guns "in practically all cases" caused the enemy aircraft to divert their course or fly higher. When the artillery could not reach its targets because they were out of range, they pointed them out to Allied pursuit aviation by firing three rounds of shrapnel in such a way as to show altitude and direction of the enemy formation. The units maintained liaison with the artillery and infantry and followed up the advance closely.[119] Fifteen years later, the Army War College was still pointing to the St. Mihiel campaign as an exceptional example of the type of antiaircraft protection which could be provided for an advancing army if the A.A. commander were vigorous and able. The leapfrog tactics whereby units moved alternately, the one providing protection for the other while it displaced forward, were particularly admired, as was the A.A. Service's success in drving off 117 German airplanes from the area of the nfantry advance. In fact, the machine gun battalion alone fired on 128 German airplanes.[120]

The experience of the 2d A.A. Battalion was similar in all respects to that of the 1st A.A. Battalion, but the duty of Battery A of that battalion is instructive in the matter of defending observation ballons. The battery was stationed in the Argonne Sector: during the offensive there in October 1918, serving guns of the French 34d Groupement Auto-Canon. The German air force was very active in resisting the American advance, and singled out observation balloons as particularly important targets. In one day, the German fighters burned nineteen of them. Battery A was assigned to protect the balloons, as well as shoot at any aircraft which crossed the lines. To do its job, the battery set up about a kilometer and a half from the front line. Capt. Scott B. Ritchie placed the battery between the balloons and the lines, so that his guns formed the apex of a triangle of which two balloons formed the base. The battery served in that duty for thirteen days, often subjected to gas attacks and artillery fire, and in the course of that time shot down four German airplanes. On October 13 the guns brought down two Fokkers within ten minutes of each other, and later in that same day shot down another fighter in flames while protecting a French Squad which was being chased by a squadron of the enemy. Shortly thereafter, Ritchie's guns shot down one more German fighter to close a remarkable day of four claims for the battery. While Battery A was involved with balloon protection, other batteries of the 2d A.A. Battalion were sited to protect field artillery batteries from air raids. German strafing attacks on the batteries became serious in October, and the reports of the 2d A.A. Battalion show that such attacks seriously hindered operations. H&S Company mounted one Hotchkiss machine gun on an improvised pedestal "suitable for Antiaircraft firing," but the battery commander still worried about the safety of his gunners and ordered them to cover when German fighters attacked his positions. Battery B found its machine guns useful on several occasions. Sgt. Hugh A. Miller and Pvt. Herbert E. Fears, manning two Hotchkiss guns, drove off a fighter attack on the guns on 6 October, and on 18 October 1st Lt. George H. Brush found that his machine gunners had hit a Rumpler C. IV thirteen times, although a piece of H.E. shell through the gas tank had actually brought the plane down. Battery B, manning guns of the Section 57 Demi-Fixe on alternate days with French gunners, was emplaced during that time to protect the 69th Balloon Company.[121]

In accordance with Maj. Goolrick's suggestion, A.A. Service Headquarters decided that each battalion should serve only a certain amount of time at thefront before it was given an opportunity to rest. The staff therefore worked out a rotation plan in which one battalion would relieve another on a regular basis in each of the Armies. When Third Army was organized, the first three A.A. battalions would be assigned to duty at the front at one per Army. The 4th, 5th, and 6th A.A. Battalions would then serve as reliefs. The plan was never put into effect because the war ended before anyone determined that the 1st or 2d A.A. Battalions needed a rest, but the 3d A.A. Battalion was being assigned to First Army when the war came to an end.[122]

Three separate batteries also served on the American front during the course of operations, and the case of the 5th A.A. Battery is entirely typical. The 5th Battery moved to the front just north of Verdun and was assigned to a French battery there. The French had four 75-mm, semi-fixed guns, but only the manpower for two, so the men of Capt. George H. King's battery took over the other two. Although they were deployed in the Second Line of A.A. defenses, the men of the 5th Battery were close enough to the Germans to be shot at by their artillery. Around the middle of September the cooks got drunk and stoked the fire in their rolling kitchen too brightly, drawing a barrage on the unit. 1st Sgt. Jeter P. Banks ran the day-to-day operations of the battery with the iron hand of any good top sergeant and dealt with the offenders himself without bothering the captain. The battery moved in October to Fort de Velleville, where it remained until relieved by the 6th A.A. Battery just after the Armistice. Throughout its stint of front line duty, the 5th A.A. Battery fired 520 rounds of ammunition and shot down one German airplane. When relieved from the front, the battery was scheduled to move to Ourches to help initiate the A.A. Defense there.[123]

The machine gun battalions fought a rather more rough and tumble war, and one that was unique among the Allies. The A.E.F. was the only force in France that supplied machine gun troops at the front for the expressed purpose of firing at airplanes. The two antiaircraft machine gun battalions which saw action accounted for only 96 of the more than 1,500 antiaircraft machine guns scattered along the American front, but they brought down virtually all of the German airplanes which fell to machine gun fire there.[124] Since they were located immediately behind the front, the machine gunners suffered considerably more casualties than the artillerymen. In the month of September the 1st A.A. M.G. Battalion had three men killed and twenty-five wounded; the 2d A.A. M.G. Battalion had five killed and forty-one wounded during its front line duty.[125] The reputation of the machine gun battalions in general as "suicide squads" extended to the antiaircraft machine gun battalions as well.

A rotation plan for combat duty similar to that envisioned for the A.A. gun battalions was drawn up for the A.A. machine gun battalions. The 3d and 4th A.A. M.G. Battalions were intended to relieve the 2d and 1st A.A. M.G. Battalions, respectively.[126] In order to make the transition easier, the commander of the relieving battalion was first sent to the front with the relieved battalion for two weeks of observation.[127] The reliefs never took place, however. The 3d A.A. M.G. Battalion was ordered to report to Ligny-en-Barrois for duty just as the war ended, and the 4th and 5th battalions likewise did not get into action.[128] The 4th A.A. M.G. Battalion was clearly about to relieve the 1st, because its commander was at the front on his orientation tour when the Armistice was signed.[129]

The entire combat duty of antiaircraft machine gun troops was therefore served by only two battalions. The 1st A.A. M.G. Battalion, under the command of Major H. D. Cushing, was in the line for the lion's share of that duty. It departed Langres for the front on 28 July 1918, less Company A, which remained behind to train the 2d A.A. M.G. Battalion.[130] The 1st A.A. M.G. Battalion was assigned to a sector which had a highly organized trench system, and was under constant shell fire for three months.[131] The unit was part of I Corps for the Aisna-Marne operation of August 1-6, and remained in the corps are for the action later known as the Defensive Sector (Champagne), through 13 August. Company A rejoined the battalion on 19 August. On 31 August the unit was detached from I Corps and placed under command of the First Army A.A. Service for the St. Mihiel offensive, from 12-16 September. After that action the battalion became a part of 2nd Army, except for Company A, which remained in First Army. The bulk of the battalion received credit for participation in the Defensive Sector (Lorraine) campaign, 17 September through 11 November, while Company A participated in the Meuse-Argonne offensive from 7 October to 11 November.[132]

In all of its front line duty, the 1st Battalion was shelled and gassed with the same frequency as the infantry, since the platoons were situated less than one kilometer from the infantry line.[133] A constant drain of casualties was the inevitable result. The St. Mihiel offensive gave the battalion an ample opportunity to show that it could give casualties as well as take them. During the month of September the 1st Battalion observed 542 German airplanes, of which 124 came within range of their guns. The companies fired at 130 airplanes during the month and shot down 13 of them. A total of 115 other aircraft were driven away by the unit's fire. Cushing delighted in reporting the capture of eight prisoners, presumably German aviators, and boasted that "it had been practically impossible for hostile planes to operate near the front line positions of our guns within a range of one thousand metres, during the entire month."[134] Some planes could not be claimed, although the kill was almost certain. The 1st Platoon of Company A fired on a German airplane on the morning of 28 September. The men clearly hit the German, because pieces of wood from the struts were shot off, fell to the ground, and were secured by the men. The plane immediately returned to the German lines, "apparently coming to the ground."[135]

The hazards of serving in the 1st A.A. M.G. Battalion's sector are illustrated by the case of 1st Lt. Philip H. Williamson of Company A. He led his company into action near Thiaucourt, where the German shellfire was particularly heavy. After helping to select gun positions, he spent most of his time moving from one crew to another, checking on his men and directing their fire. His daily visits and reconnaissances of the lines were made under heavy fire, and his "coolness and courage" extended over a period of seventeen days. When finally wounded, Williamson refused to be evacuated to hospital until his men were removed to safety as well. Lt. Williamson's heroism was recognized by a well-deserved award of the Distinguished Service Cross.[136]

The Services of the battalion were similarly recognized by the French, who awarded the unit the Croix de Guerre with Gilt Star with the following citation:

> Under the active and brilliant leadership of its commander, Major Cushing, it distinguished itself by the results which it obtained on the Marne and Moselle, by the heroism which it displayed and by its high ideals.[137]

The 1st A.A. M.G. Battalion ended the war with Second Army, where it was deployed to protect rail heads and bridges near the front and infantry support and reserve positions at the front. The war may have been drawing to a close, but the fighting did not slacken at all. The battalion shot down seven airplanes in October and three in the first eleven days of November, while its "gun positions were constantly under heavy enemy high explosive and gas shell fire."[138]

The war experience of the 2d A.A. M.G. Battalion, although briefer, was very similar. Major Orville J. Whitney received orders on 25 September 1918 to take his companies to the First Army area.[139] Part of the battalion was stationed along the Meuse River; Company B was attached to the Anti-Aircraft Defenses of Colombey-les-Belles until 13 October, and Company A was attached to the 1st A.A. M.G. Battalion for the St. Mihiel operation, not returning to its parent battalion until 1 October. The 2d A.A. M.G. Battalion's positions along the river allowed it to support the attacking American infantry in the Meuse-Argonne offensive.[140]

The most important task of the battalion was to cover the crossing of the Meuse by infantry, driving off the German aircraft as they descended to strafe the attacking troops.[141] German shelling was heavy along the Meuse, and the men had to emerge from their shelters during barrages to fire, because the Meuse valley was a route much favored by German aircraft.[142] Many men were wounded in the shelling, and the casualties mounted when the companies advanced with the infantry.[143] As the offensive continued, the battalion set up to protect the roads and bridges which were needed to support the advance.[144]

One measure of the intensity of the fighting and the degree to which the unit suffered from enemy artillery is the decorations for valor awarded to its soldiers. The Distinguished Service Cross was awarded to Sgt. George Weitzenberg of Company A for his courage during a barrage on 25 September. The German-born American saw two infantry soldiers injured by an exploding shell. He immediately ran through violent fire to their aid. He took the surviving soldier to shelter and gave him first aid until he could be taken to the rear.[145] 2nd Lt. Samuel F. Telfair was leading a patrol to reconnoiter new positions for the guns of his platoon of Company C on 4 November when an artillery barrage descended upon his group. He led the men to cover and then returned to the shell-swept area with Pvt. Laurel B. Heath to pick up one of his men who had been wounded. In spite of the shellfire and gas barrage, during the course of which Lt. Telfair was wounded, the two men carried the injured soldier to safety. Both were decorated with the Distinguished Service Cross.[146]

The 2d A.A. M.G. Battalion remained in action, subject to such conditions as those, until 11 November. With the rapid advance and arduous service of the battalion, Maj. Whitney could have had little time to spare for the niceties of official correspondence; he had other problems with which to deal. Despite that, the Headquarters of the A.A. Service took exception to the brevity of his reports. Whitney was sharply reprimanded for his approach to administration in a letter of 25 October to the Chief of A.A. Service of his Army:

> There are enclosed herewith copies of correspondence originated by Major Whitney, of the

> 2nd Anti-Aircraft Machine Gun Battalion. It is not necessary to remark on the unsatisfactory form of it.
>
> You are requested to take such action as you deem necessary, either by means of advice or through official communication, to show this officer how stupid and unintelligible are the communications which we are continually receiving from him . . . .[147]

That letter was directed to an officer whose battalion had claimed eleven airplanes in the first half of October and seven in the second half of the month—most of them confirmed.[148] Wars, it seems, may come and go, but correspondence is forever.

Even sharper letters found their way to the A.A. units any time an Allied aircraft was fired upon by friendly troops. Although the A.A. M.G. battalions operated a very small percentage of the antiaircraft machine guns on the American front, they usually had to prove their innocence any time errors in aircraft identification took place. All front line units, but particularly artillerymen, collected machine guns of all types discarded or damaged on the battlefield and mounted them for protection against aircraft. Once their Cauchats, Vickers, Brownings, Hotchkiss, and captured Maxims were set up for high angle fire, the troopers used them to pot indiscriminately at *all* aircraft.

The average soldier evidently believed that "there ain't no such thing as a 'friendly' airplane," and complaints from the Air Service were so common that A.A. units tried to forestall trouble in their sectors. The 1st Platoon of Company A, 1st A.A. M.G. Battalion, for instance, took immediate steps to avoid accusations of guilt for such an episode on 28 September 1918. Lt. Thomas F. Coleman saw machine guns of a nearby artillery battery fire at Allied planes at long range several times that day. He sent a sergeant to call that fact to the battery commander's attention, and was duly informed that the battery had orders to shoot at all planes flying over its position.[150]

On another occasion, one Lt. McMullen of the 4th Pursuit Group returned from a flight over Allied territory, in which his Spad was not engaged in combat, with "a bullet hole in one wing close to the pilot's seat." Investigation of the incident by the 1st A.A. M.G. Battalion revealed that the 21st Machine Gun Battalion was the culprit. Capt. Wilson M. Spann noted in his report that

> There have been frequent occasions where M.G. organizations untrained in anti-aircraft firing have fired on Allied or enemy planes at impossible ranges. Wherever possible, the organization commander had been interviewed and made acquainted with existing regulations.[151]

The problem was sufficiently wide-spread for the Chief of Artillery of First Army to minute his units about it. He gave them warning that

> Battery commanders will see that the men serving anti-aircraft machine guns are conversant with the markings of Allied and hostile planes. They will not be permitted to fire on a plane until its hostile character is determined beyond possibility of doubt by its markings or actions. The fact that others are firing or have fired on a plane is no proof that it is hostile.[152]

The guilt almost certainly did not lie with field artillery units alone, however. In the heat of the moment it was all too easy to fire on any airplane which approached too near, particularly if the unit in question had been strafed in the past. Capt. Alvin Smith did not recall ever firing at a friendly aircraft, but qualified his statement when he added that

> We would spot the aircraft at a considerable distance, and to identify them was difficult. If it flew over us, we fired at it.[153]

The problem was further compounded by inadequate liaison and training. Although the A.A.A. School included aircraft recognition in its training programme for all sections of the school and published aircraft recognition charts, the training schedule for the A.A. machine gun section shows no time alloted to the subject.[154] Similarly, the Air Service did not accept its share of the responsibility, because the Routine Procedures it published to guide the activity of various types of groups listed no specifics for the ways in which squadrons were to carry out coordination with the A.A. Service. Eventually, the Air Service published the "Daily Table of Letters and Couleurs of Acknowledgement," a challenge and reply identification system, to aid in aircraft recognition. Although it was widely distributed, there is no evidence that it was particularly effective either.[155]

As a result, the business of banging away at friendlies continued unabated throughout the war. Visual aircraft recognition remained and remains a central problem of air defense. Paradoxically, the relatively undisciplined and untrained firing of ground units at aircraft resulted in the only American antiaircraft action of World War I which was recognized by the award of a medal. Sgt. Frank Gardella, Jr., of the 165th U.S. Infantry, better known as the "Fighting 69th" New York Infantry, was decorated with the Distinguished Service Cross for a remarkable victory:

> When 2 enemy airplanes flew parallel to our infantry lines north of the River Ourcq, near Villers-sur-Fere, France, 28 July 1918, pouring machine-gun bullets into our positions and driving everyone to cover, he rushed to his machine gun and took aim at the upper of the 2 machines.
>
> Although he was constantly subject to a storm of bullets from the planes and from enemy snipers on the ground, he nevertheless cooly sighted his gun and riddled the upper plane. It collapsed and fell in flames, striking the lower one as it fell and causing it to crash to the earth also.[156]

Still, the idea of entrusting the task of low altitude air defense to machine gun battalions specially organized and trained for the job was a sound one. Sgt. Gardella's double kill and medal notwithstanding, virtually all of the German aircraft shot down by machine guns fell to the two A.A. M.G. battalions.

The Germans fought hard right to the end of the war, and that was as true of the German Air Force as it was of the German infantry. There was no sense of war tapering off to its conclusion, and the A.A. Service was actively preparing more units for service at the front when the Armistice took effect. The 11th and 12th A.A. Batteries were on 9 November ordered from Fort de Stains to Second Army for duty.[157] They never arrived at the front, however, and were ordered to move to the ports of embarkation for return to the United States only eleven days later.[158]

As soon as the Allied command realized that the Armistice would endure, the A.E.F. began a rapid demobilization. For its part, the A.A. Service dismantled in less than two months an organization it had labored for a year and a half to build. Unfortunately, the headquarters elements were among the first to go, and the consequence was that the battalions became "homeless orphans," in the words of Maj. H. D. Cushing, and had no one to represent their campaign participation when such things were tabulated.[159] A long string of telegrams flashed out from Chaumont to instruct the A.A. units to return to the United States for demobilization.[160] The units turned in their motor transport and equipment and reported to the ports to await their ships.[161] The troops who left France departed under the leadership of reserve officers and other non-professionals, for the most part. The Regulars were detached from the units and assigned to the newly-activated Third Army, which was to be the Army of Occupation.[162]

At the Armistice, the French withdrew the greater part of their augmentation of the American A.A. Service, leaving only twenty semi-mobile batteries at the disposal of Col. Hopkins. On 21 November those units too were returned to French control, with Hopkins' full agreement. He consented to the transfer with the assumption in mind that "no American Anti-Aircraft Artillery units will be required with our 3rd Army."[163] The A.A. artillery and machine gun units melted away, and the 56th Engineers were likewise relieved from assignment to the A.A. Service at the end of November.[164] There was no need for an A.A. Service in Europe, as far as the G.H.Q. could determine, because of clauses in the Armistice Agreement which dismantled the air forces of the Central Powers.

The men who embarked for home took very little antiaircraft equipment back with them, either. Most of the 75-mm guns were returned to the French, save the two owned by the A.E.F., and the antiaircraft machine guns were only a small parcel of cargo. When the rear area defenses were dissolved, the units had to satisfy the terms of the leases for the ground on which the guns had been installed by demolishing the gun pits and filling them in.[165] The gun mounts themselves were left behind because "the improvised . . . mounts [were] considered to have insufficient value to warrant their being returned to the United States," and they were sold for scrap.[166]

There was no apparent aerial threat to the continental United States in 1918 either, and no antiaircraft organization was maintained in the Army. When the units returned home they were demobilized, and the National Army batteries were dissolved. Those A.A. units which had been organized from Regular Army Coast Artillery companies therefore returned to coastal defense duty.[167] Battery B, 1st A.A. Battalion, was a case in point. It returned to the Harbor Defenses of San Francisco as the 44th Company.[168] The Regular Army soldiers likewise turned from A.A. gunnery to the old familiar coastal gunnery that they had known before the war. By 1919, no trace of the A.A. Service remained, and the Army had no antiaircraft arm until the battleship *vs.* bomber controversy raised by Brig. Gen. William Mitchell roused interest in it again. The promising start in A.A. Artillery Gen. Shipton, Col. Hopkins, and their men made, and the fine combat record their dedicated gunners established, were both shelved in the general demobilization of the Army in 1919.

ENDNOTES

[1] Ltr, Chief of AAS to Co, Ft. Monroe, Subj: Aeroplane Souvenir, 26 June 1918, and Ltr, Commandant, Ft. Monroe, to Chief of A.A. Service, Subj: Aeroplane Souvenir. AAS Records, Reel 1.

[2] Bulletin No. 5, Hq. A.A. Service, AEF, 9 November 1918. AAS Records, Reel 1.

[3] Technical Report on an Aeroplane Brought Down, Hq. 2nd Army AAS. September 1918. AAS Records, Reel 8.

[4] Ltr, Memorandum for Col. Thomas, G-2, GHQ, from Maj. O. L. Spiller, HQ. AAS, 6 October 1918. AAS Records, Reel 8. Oddly enough, the identity of the battery was not specified in the report.

[5] Ltr, Chief of AAS to Chief of AAS, 2nd Army, Subj: Planes Brought Down By the 1st AAMG Bn, 8 November 1918, with 1st through 3rd indorsements. AAS Records, Reel 1.

[6] Memorandum, Hq. AAS, 2nd Army, to CO, 1st AAMG Battalion, 3 November 1918. AAS Records, Reel 1.

[7] [U.S. Army Air Defense School.] *Air Defense. An Historical Analysis,* Vol. I (Ft. Bliss, Texas: USAADS, 1965), p. 20. Also see Maj. J. C. Haw, "Anti-aircraft Defense," in *Coast Artillery Journal,* Vol. 63, No. 4 (October 1925), pp. 318-328.

[8] Hq. AAS Information Letter No. 6, 21 November 1918. AAS Records, Reel 4.

[9] See 1st Lt. Burgo D. Gill, "Anti-aircraft in the A.E.F.," in *Coast Artillery Journal,* Vol. 76, No. 2 (March-April 1933), pp.

85-91. With seven of eleven batteries reporting, kills for the period 23 August to 31 October alone were 11. See Hq. AAS Information letter No. *6, op. cit.* Also, lecture by Maj. Gen. William F. Hase, Chief of Coast Artillery, to Army War College G3 Course No. 6, "Anti-aircraft Artillery Organization and Development," typescript in U.S. Army War College Lectures, 1934-1935, MHRC.

[10] Final Report of the Chief of Anti-aircraft Service, 2 January 1919, GHQ AEF Superior Board File: Folder 4: Report, in AEF-OR, Vol. XV, p. 217. Also see Memorandum for Chief of Artillery AEF from Chief of AAS, Subj: Anti-Aircraft Artillery, 3 December 1918. AAS Records, Reel II.

[11] *Ibid.,* pp. 216-217. Also see Hase lecture, AWC, in MHRC, and Hq. AAS Information Letter No. 6, 21 November 1918, in AAS Records, Reel 4. The latter shows 38 aircraft shot down by machine guns for the period of 23 August through 31 October alone. Also see Memorandum for Chief of Artillery AEF from Chief of AAS, Subj: Anti-Aircraft Artillery, 3 December 1918. AAS Records, Reel 11. U.S. Army records on AA kills are explicit, and although French and British records were not consulted on this point, the AA Service's claims appear to be justified. American claims were not disputed at the time, and were accepted by post war AA Councils of the Allies. See note 3, Ch. III, and note 13, *infra.*

[12] Final Report of the Chief of Anti-aircraft Service, pp. 217-218.

[13] *Viz.* French A.A.A. confirmations: 2 in 1915, 87 in 1916, 124 in 1917, and 42 for the first quarter of 1918, as compared to more than 60 for the American Service in one quarter of 1918. See Report on French A.A. Service, Hq., AAS, 1918. AAS Records, Reel 7.

[14] "American Anti-Aircraft Artillery," in *Journal of the United States Artillery,* Vol. 50, No. 3. (May 1919), p. 340.

[15] Basic information for the discussion of fixed defenses was taken from Final Report of the Chief of Anti-aircraft Service, 2

January 1919, contained in AEF-OR, Vol. XV, pp. 208-220. Specifically see the section "Anti-aircraft Defenses in the S.O.S.," pp. 218-220. Other sources are cited separately.

[16] See correspondence relating to requests for establishment of A.A. defenses in AAS Records, Reel 2.

[17] Correspondence, Hq. Air Service to Hq. AAS, in AAS Records, Reel 3.

[18] *Ibid.*

[19] Memorandum, Hq. AAS, AEF, for Chief of Air Service, Subj: Determination of Priority in Installation of A.A. Defenses, 29 October 1918. AAS Records, Reel I.

[20] The Defense Priority List changed as the war progressed, generally becoming shorter as the German aerial threat appeared to decrease. A list from early 1918, for example, lists 16 sites. See Memorandum, Defense Plans S.O.S., in AAS Records, Reel 2. C.f. Memorandum, Present Status of Antiaircraft Defense Projects, July 1918, AAS Records Reel 2; Ltr, GHQ, AEF, to Chief of AAS, Subj: Priority for Defense, 8 June 1918, in AAS Records, Reel 2; Ltr, Chief of AAS to Chief of AS, Subj: Priority of AAD, 28 August 1918, in AAS Records, Reel 1.

[21] Various orders exist; studies were not necessarily made in the sequence provided by the Defense Priority List. For example, HQ AA & TM Schools SO 9, 4 January 1918, appointed Maj. Jay Hopkins, Capt. Glenn Anderson, and two French officers to consider the AAD of Langres, the AA Plan for which was not approved for nine months. See Ltr, Chief of AAS to CiC, AEF, Subj: Anti-Aircraft Defense of Langres, 19 September 1918, in AAS Records, Reel 3. The CG of the S.O.S. made his own studies. HQ SOS AEF SO 61, 1 April 1918, appointed a board of officers to study AAD of stations in the SOS. AAS Records, Reel 2.

[22] Ltr, Hq. AA & TM School to AG, AEF, Subj: Report on Anti-Aircraft Defense of Gonrecourt and Amanty, 21 March 1918. AAS Records, Reel 2. The defenses were never set up.

[23] See Ltr, Hq. AA & TM Schools to CiC AEF, Subj: AA Defense of Langres, 4 March 1918, in AAS Records, Reel 2; Ltr, Ch. AA & TM Schools to AG, AEF, Subj: Anti-Aircraft Defense of Colombey-les-Belles, 27 March 1918, in AAS Records, Reel 2; Ltr, Commandant Hq. AA & TM Schools Centre of Instruction, to AG AEF, Subj: Anti-Aircraft Defense of Chaumont and Jonchery, 12 March 1918, in AAS Records, Reel 2; Ltr, Commandant AA & TM Schools to AG AEF, Subj: A.A. Defense of Vittel and Contrexeville, 22 March 1918, in AAS Records, Reel 3; Memorandum for ACofS G-4 from ACofS G-3, AEF, Subj: Anti-Aircraft Defense of Haussimont (Marne), 28 August 1918, in AAS Records, Reel 2, and Ltr, Chief of AAS to CiC AEF, Subj: Anti-Aircraft Defense of Ourches, 4 September 1918, in AAS Records, Reel 3; and Ltr, Chief of AAS to CiC AEF, Subj: Anti-Aircraft Defense of Neufchateau Area, 2 October 1918, in AAS Records, Reel 3.

[24] Final Report of the Chief of Anti-aircraft Service, p. 220.

[25] *Ibid.,* p. 218.

[26] Memorandum for CoS, AEF, from ACoS G-3, Subj: Anti-aircraft Defense of Is-sur-Tille, 20 February 1918. AAS Records, Reel 11.

[27] Ltr, CoS AEF to CO, 1st AA Btry, Subj: Movement to Is-sur-Tille, 20 February 1918. AAS Records, Reel 11. Also Ltr, CoS AEF to Chief of AAS, Subj: Movement of 1st AA Battery to Is-sur-Tille, 20 February 1918. AAS Records, Reel 5.

[28] Telegram, GHQ AEF to CG, SOS, 10 May 1918, in AAS Records, Reel 11. Also see Ltr, Hq. AAS to CG Army Artillery, 1st Army, 4 May 1918, in AAS Records, Reel 2.

[29] See Lineage Files for 1st, 2nd, 3rd, and 4th A.A. Batteries, Organizational History Branch, Center of Military History, Washington, D.C. (hereinafter cited as CMH Lineage Files).

[30] Cullum File, Anderson, G.P. ('14 #5278), U.S.M.A. Library Special Collections.

[31] *Army Register,* 1940. Ltr., Chief of AAS to CG, Army Artillery, 1st Army, Subj: Transfer of Officers, 31 May 1918. AAS Records, Reel 2.

[32] *Army Register,* 1920. He evidently did not learn of his promotion until some time in July, for he signed himself as captain through July 1918.

[33] Personal letter, J. A. Shipton to Fox Conner, 3 May 1918, in AAS Records, Reel 11.

[34] Ltr, CO 1st AA Btry to Advance Ordnance Depot No. 1, Subj: Anti-Aircraft Mounts, 8 March 1918. AAS Records, Reel 10.

[35] Various correspondence reporting shortages, units to Hq. AAS, in AAS Records, Reel 2.

[36] Ltr, Hq. AAS to CG, Army Artillery, 1st Army, AEF, 4 May 1918, AAS Records, Reel 11.

[37] Ltr, CO AAD of APO 712 to Chief of AAS, Subj: A.A. Defense of APO 712, 28 May 1918, with 1st Ind. from Hq. AAS to CO, AAD of APO 712, 4 June 1918. AAS Records, Reel 2.

[38] Memorandum, Anti-Aircraft Artillery. Units in the Field, 14 June 1918. AAS Records, Reel 5.

[39] Memorandum, Present Status of Anti-Aircraft Defense Projects, n.d., in AAS Records, Reel 2. Correspondence with Mr. Munro Fox, formerly Sergeant, 18th Platoon, Company D, 56th Engineers, at Is-sur-Tille July-November 1918.

[40] Ltrs, Chief of AAS to units of 8th AA Sector, Subj: Materiel, 28 August 1918, with replies from units. AAS Records, Reel 6.

[41] Final Report of the Chief of Anti-aircraft Service, p. 219.

[42] CMH Lineage Files: 1st AA Btry, 2nd AA Btry, 3rd AA Btry, 4th AA Btry.

[43] Ltr, Historical Section of AWC to Adjutant General, 28 June 1926, in CMH Lineage File, 3rd AA Battery.

[44] War Diaries for October 1918, sent from unit commanders to Chief of AA Service. AAS Records, Reel 10.

[45] A.A.A. School Lecture on Anti-Aircraft. AAS Records, Reel 7.

[46] Ltr, CO 4th AA Btry to CO AAD of APO 712, Subj: Report of Firing, 15 July 1918, with indorsements. AAS Records, Reel 2.

[47] *Ibid.,* 2nd Indorsement.

[48] *Ibid.,* 3rd Indorsement.

[49] Hq. Army Artillery, 1st Army, SO 225, 17 September 1918. Robertson was moved to Chaumont, then to Colombey-les-Belles.

[50] Ltr, CO AAD of APO 712 to Chief of AAS, Subj: Restricted Area for Aeroplanes, 6 August 1918. AAS Records, Reel 2.

[51] Memorandum, Maj. W. D. Frazer, Hq. AAS, for Gen. J. A. Shipton, 28 June 1918. AAS Records, Reel 2.

[52] Ltr, Commandant Hq. AA & TM Schools Center of Instruction to AG, AEF, Subj: Anti-Aircraft Defense of Chaumont and Jonchery, 22 March 1918. AAS Records, Reel 2.

[53] *Supra,* p. 35. Also, Ltr, CoS AEF to CG, Army Artillery, 1st Army AEF, Subj: Temporary Use of Personnel from Army Artillery Replacements as Anti-Aircraft Batteries, 9 June 1918, in AAS Records, Reel 11; and Ltr, Chief of AAS to Chief of Artillery, 1st Army AEF, Subj: Personnel for Anti-Aircraft Batteries, 11 June 1918, in AAS Records, Reel 2. See Ltr, CO AAD of APO 706 to Chief of AAS, Subj: Leases of Property, 19 August 1918, in AAS Records, Reel 2. The batteries were organized at Haussimont on 18 June 1918. See CMH Lineage Files, 3rd Provisional A.A. Battery, 9th A.A. Sector. Provisional batteries were organized in accordance with T.O. 298, War Department, 27 March 1918.

[54] Memorandum, Hq. AAS, 23 July 1918, in AAS Records, Reel 6; also Memorandum, Hq. AAS, 9th A.A. Sector, n.d., in AAS Records, Reel 2.

[55] Final Report of the Chief of the Anti-Aircraft Service, p. 219.

[56] Memorandum, Present Status of Anti-Aircraft Defense Projects, n.d., in AAS Records, Reel 2. Ltr, Chief of AAS to G-3, AEF, Subj: Movement of Troops, 30 September 1918. AAS Records, Reel 2.

[57] Ltrs, Chief of AAS to 1st-3rd Provisional A.A. Batteries, Subj: Materiel, 28 August 1918. AAS Records, Reel 6.

[58] Memorandum, Present Status of Anti-Aircraft Defense Projects, n.d. AAS Records, Reel 2.

[59] Ltr, Chief of AAS to Chief Ordnance Officer, AEF, Subj: Anti-Aircraft Ammunition, 29 August 1918. AAS Records, Reel 2.

[60] Memorandum, Capt. R. R. Robertson, AAD of APO 706, to Lt. Holland, Hq. AAS, 30 August 1918. AAS Records, Reel 2. Anti-Aircraft Ammunition was shipped at nine rounds to the case.

[61] Final Report of the Chief of Anti-aircraft Service, p. 219.

[62] "How G.H.Q. Was Protected From Air Raids," in *Liaison. The Courier of the Big Gun Corps,* Vol. I, No. 6 (25 January 1919), p. 40.

[63] Cullum File, Flanigen, B. L. ('16 #5588), A.O.G., U.S.M.A.

[64] Ltr, Ch. AA & TM Schools to AG, AEF, Subj: Anti-Aircraft Defense of Colombey-les-Belles, 22 March 1918. AAS Records, Reel 2.

[65] *Ibid.*

[66] Memorandum, Present Status of Anti-Aircraft Defense Projects, n.d., shows no work at Colomby-les-Belles as of 8 July 1918. AAS Records, Reel 2. Hq. AAS Memorandum for Lt. Col. Casey, Q.M.C., 8 August 1918, shows those units destined for the defense still in training. AAS Records, Reel 4.

[67] Ltr, Chief of AAS to G-3 AEF, Subj: Movement of Anti-Aircraft Battery, 16 September 1918. AAS Records, Reel 2.

[68] Ltr, Chief of AAS to G-3, AEF, Subj: Movement of Anti-Aircraft Batteries, 16 September 1918. AAS Records, Reel 11.

[69] Ltr, Chief of AAS to G-3 AEF, Subj: Company B 2nd Anti-Aircraft Machine Gun Battalion, 17 September 1918. AAS Records, Reel 2. CMH Lineage File, 2nd A.A. M.G. Battalion.

[70] Ltr, Chief of AAS to G-3 AEF, 16 September 1918, in AAS Records, Reel 2; and Ltr, G-3 to Chief, French Military Mission, G.H.Q., A.E.F., Subj: 6th and 8th Anti-aircraft Batteries, 18 September 1918. Units were sent to the French in early August. See Ltr, Chief of French Military Mission to General Army Group of Armies of the East, 10 August 1918, and Memorandum, G-3 AEF for Chief of Artillery, Subj: Disposition of Anti-Aircraft Batteries, 20 August 1918. AAS Records, Reel 11.

[71] Telegram, Spiller (Hq. AAS) to Robertson (APO 731-A), 21 September 1918. AAS Records, Reel 2. Telegram, CO 9th AA Btry to Chief of AAS, 24 September 1918. AAS Records, Reel 5. Also CMH Lineage File, 9th A.A. Battery.

[72] Ltr, AWC to the AG, Subj: Battle Participation of the 2nd Anti-Aircraft Machine Gun Battalion, 23 March 1925, in CMH Lineage File, 2nd A.A. M.G. Bn.

[73] CMH Lineage File, 6th A.A. Battery. Also Ltr, CO AAD of APO 731-A to Chief of AAS, Subj: Firing, 18 November 1918. AAS Records, Reel 2. For assignments of the 6th, 7th and 8th A.A. Batteries to French units for training, see Hq. Arty. Sec., A.A.A. School, SO 116, 25 August 1918. AAS Records, Reel 12.

[74] CMH Lineage File, 8th A.A. Battery. Also Ltr, CO AAD of APO 731-A to Chief of AAS, Subj: Firing, 18 November 1918. AAS Records, Reel 2.

[75] Telegram 31, Adj. AAS to Robertson, 9 October 1918; Telegram 32, Hopkins to Chief of A.A. Service, 1st Army, 10 October 1918; Telegram, Hopkins to Chief of Artillery, 1st Army, 10 October 1918. AAS Records, Reel 2.

[76] CMH Lineage Files, 7th A.A. Battery. Also Ltr, CO AAD of APO 731-A to Chief of AAS, Subj: Firing, 18 November 1918. AAS Records, Reel 2.

[77] Ltr, Chief of AAS to Chief of Ordnance, A.E.F., Subj: Delivery of 75mm Guns & Mounts, 26 September 1918, with 2nd Ind, 9 October 1918. AAS Records, Reel 9. Also see Final Report of the Chief of Anti-Aircraft Service, p. 219.

[78] *Ibid.*

[79] Ltr, CO AAD of APO 731-A, to Chief of AAS, Subj: Report, 2 November 1918. AAS Records, Reel 2.

[80] *Ibid.*

[81] Ltr, CO AAD of APO 731-A to Chief of AAS, Subj: Report, 29 October 1918; and Ltr, CO 56th Engineers to G-2, Second army, Subj: Intelligence Reports on Night Bombing, 29 October 1918. AAS Records, Reel 2.

[82] Ltr, Robertson to Chief of AAS, Subj: Status of These Defenses, 29 October 1918. AAS Records, Reel 2.

[83] Memorandum, Hq. AAS, 4 November 1918. AAS Records, Reel 2. Hopkins cited GHQ AEF GO 181 as his authority.

[84] Ltr, CO AAD of APO 731 to Chief of AAS, Subj: Report, 2 November 1918. AAS Records, Reel 2.

[85] Final Report of the Chief of Anti-Aircraft Service, p. 219.

[86] *Ibid.*

[87] Ltr, Ch. AA & TM Schools to AG, AEF, Subj: Anti-Aircraft Defense of Colombey-les-Belles, 22 March 1918. AAS Records, Reel 2.

[88] Final Report of the Chief of Antiaircraft Service, pp. 218-220.

[89] Ltr, Chief of AAS to Chief of Ordnance, A.E.F., Subj: Delivery of 75mm Guns & Mounts, 26 September 1918. AAS Records, Reel 9.

[90] Hq. AAS AEF SO 13, 28 September 1918. AAS Records, Reel 3. The Sector was alerted to move on 28 September 1918. CMH Lineage Files, 11th A.A. Battery.

[91] Ltr, Chief of AAS to Chief Ordnance Officer, A.E.F., Subj: Anti-Aircraft Ordnance Materiel, 20 November 1918. AAS Records, Reel 10.

[92] Final Report of the Chief of Antiaircraft Service, p. 215.

[93] *Ibid.,* p. 211. Ltr, Chief of AAS to CG, Army Artillery, 1st Army, Subj: Transfer of Anti-Aircraft Artillery Batteries, 20 May 1918. AAS Records, Reel 11. Ltr, Memorandum from ACofS G-3 for CoS, Subj: Employment of Battery B, 1st Bn., Anti-Aircraft Artillery, 22 May 1918. AAS Records, Reel 11.

[94] Ltr, CiC to The Chief of French Military Mission, Subj: Anti-Aircraft Defense, 22 August 1918. AAS Records, Reel 11.

[95] Memorandum, ACofS G-3 AEF to CoS 1st Army, Subj: French Anti-Aircraft Materiel and Personnel, 28 August 1918. For quantities, type, designations, and Corps assignments of French units in 1st Army, see Memorandum, Chief of A.A. Service, 1st Army, 5 September 1918. AAS Records, Reel 11. C.f. *Report of the First Army. American Expeditionary Forces* (Washington: U.S.G.P.O., 1920), Appendix D.

[96] Ltr, CiC AEF to Chief of French Military Mission, Subj: Disposition of Batteries, 1st Corps Anti-Aircraft Battalion, 6 July 1918. AAS Records, Reel 11. Also see Final Report of the Chief of Anti-Aircraft Service, p. 215. Also GHQ French Armies of the East. Order No. 13.140, 25 January 1919; and Ltr, AG of the Army to AG, State of Ohio, Subj: French Decoration, 6 July 1920. AAS Records, Reel 13. For some reason, the award, received after the battalion was disbanded, was sent to Ohio for safekeeping.

[97] Memorandum, Report of the Day, May 27, 1918, Battery A, 1st A.A. Bn. AAS Records, Reel 4. Also Memorandum, Chief of A.A. Service, 1st Army, 5 September 1918. AAS Records, Reel 11. Smith Interview. Ltrs, CO Btry A, 1st AA Bn, to Hq. AAS, Subj: Weekly Report of Station, Armament, Duty, and Operations, various dates; and Ltrs, Battery A Monthly War Diaries for August-November, various dates. AAS Records, Reel 14.

[98] Final Report of the Chief of Antiaircraft Service, p. 215.

[99] GHQ AEF GO 51, 3 April 1918, established the A.A. Service of 1st Army. GHQ AEF SO of 26 October 1918 reassigned A.A. units to form the A.A. Service for 2nd Army. Also see Telegrams, G-3 AEF to CG 2nd Army, 8 November 1918. Attached memoranda show that the transfer was made by GHQ on the basis of Col. Hopkins' recommendations. AAS Records, Reel 11.

[100] Telegram, Hunter Liggett to GHQ AEF, 8 July 1918. AAS Records, Reel 11.

[101] Ltr, Maj. Robert E. M. Goolrick to CG AAA, AEF, Subj: Report of Headquarters and Supply Co., 1st AA Bn (CAC), 5 June 1918. AAS Records, Reel 4. H&S Co. was the first battery to proceed to the front, going on 15 April. See CMH Lineage File, 1st A.A. Battalion (C.A.C.). Assignments of batteries to French units for training were made by Hq. Arty. Sec., A.A.A. School SO 46, 14 April 1918. AAS Records, Reel 12.

[102] Ltr, Maj. Robert E. M. Goolrick to CG AAA AEF, Subj: Letter of Transmittal, n.d., but June 1918. AAS Records, Reel 4.

[103] War Diary for October 1918, Battery B, 1st AA Bn (CAC), 4 November 1918. AAS Records, Reel 5. Anti-Aircraft Service Plan, Hq. AAS, 1st Army AEF, 23 September 1918. AAS Records, Reel 12. Smith Interview. HQ. 1st AA Bn SO 65, 5 October 1918, Smith service record.

[104] Ltr, CO 1st AA Bn to Chief of AAS, 1st Army, Subj: Report of Shelling of Battery B, 1st Anti-Aircraft Battalion, C.A.C., 31 October 1918. AAS Records, Reel 11.

[105] For example, see Hq. AAS, 1st Army, Report on Operations for Period 25 September to 18 October 1918, 28 October 1918. AAS Records, Reel 11.

[106] Smith interview. Also War Diary for October 1918, Battery B, 1st Bn (CAC), 4 November 1918. AAS Records, Reel 5. Also, Ltr, CO B/1st AA Bn to Chief of AAS, Subj: Report, 21 June 1918. AAS Records, Reel 4.

[107] Hq. AAS 1st Army Report of Operations for Period 25 September to 18 October 1918, 28 October 1918, for example,

outlines the effect of bad weather in decreasing German sorties. Also see Records of the Hq., 1st AA Bn, and H&S Co. Operations Reports and War Diaries of H&S Co. show that weather was a factor. For the 27 days of October the company was in action, 18 were cloudy or rainy. AAS Records, Reel 13.

[108] Ltr, CO 24th AA Btry, 1st AA Sector, to Chief, AAS, Subj: War Diary, 4 December 1918. AAS Records, Reel 4. Ltr, CO 21st AA Btry, 1st AA Sector, to Chief of AAS, Subj: War Diary for Month of November 1918, 1 December 1918, also shows constant bad weather and little firing. AAS Records, Reel 14.

[109] Ltr, CO B/1st AA Bn to Chief of AAS, Subj: Report, 21 June 1918. AAS Records, Reel 4.

[110] Ltr, CO B/1st AA Bn to 1st Lt. G. S. Whitman, AAS, Subj: Papers & etc., 24 July 1918. AAS Records, Reel 9.

[111] Ltr, CO 1st AA Bn to Hq. AAS, Subj: Stations of Batteries, 1st A Bn, 20 July 1918. AAS Records, Reel 5. As a result, the reports made to A.A. Service Hq. by Army A.A. Service Chiefs were equally vague. For an example, see Ltr, Chief of Arty, 1st Army, to Chief of Arty AEF, Subj: Stations and operations of Army Artillery, n.d. AAS Records, Reel 5.

[112] Smith interview; the official records confirm his recollections. Hq. & Supply, C, and D Batteries were organized in California from existing C.A.C. Companies as well. CMH Lineage File, 1st A.A. Battalion (C.A.C.).

[113] A typical example is cited in Ltr, CO B/1st AA Bn to Chief of AAS, Subj: Assignment, 22 August 1918. AAS Records, Reel 5.

[114] Ltr, R. W. Collins to J. P. Hopkins, 9 October 1918, AAS Records, Reel 5.

[115] Ltr, Wing Commander, Army Balloons, 2nd Army AEF, to CO 15th Balloon Co. (IV Corps), Subj: Burning of Balloon, November 5th, 5 November 1918; 2nd Indorsement, CO 15th Balloon Co. to Wing Commander, Army Balloons, 2nd Army, 7 November 1918; and 7th Indorsement, Chief of AA Service, 2nd

Army AEF, to Chief of AA Service, 23 November 1918. AAS Records, Reel 1. Ltr, 2nd Lt. J. H. Beaver to CO, H&S Co., 2nd AA Bn, Subj: Burning of Balloon 15, 6 November 1918, with indorsement. AAS Records, Reel 15.

[116]Anti-Aircraft Service Plan, Hq. AAS, 1st Army AEF, 23 September 1918. AAS Records, Reel 12. Also Hq. AAS, 1st Army AEF Report on Operations for Period 25 September to 18 October 1918, 28 October 1918. AAS Records, Reel 11. Another example is Hq., AA Service, 2nd Army AEF, Outline. Plan for Anti-Aircraft Defense, 5 November 1918. AAS Records, Reel 1.

[117]*Ibid.* Also see Hq. 1st Army AEF SO 75, 9 October 1918, which appointed a board of officers to study the searchlight dilemma, and Hq. 1st Army AEF Report of Board of Officers, 15 October 1918. AAS Records, Reel 12. Ltr, Capt. A. W. Bryan, Engineers, U.S.A., to CO, 56th Engineers, AEF, Subj: Report, 1 September 1918. AAS Records, Reel 11.

[118]Hq. AAS 1st Army Report on Operations for Period 25 September to 18 October 1918, 28 October 1918. AAS Records, Reel 11.

[119]*Ibid.*

[120]*Ibid.* Also, Army War College Course, 1934-35. G-3. Report of Committee No. 4. Subj: Development of Weapons and Means of Communication. Training Doctrines. Appendix C to Supplement 1, "A Brief Sketch of the development of antiaircraft defense (1916-1918)."

[121]"The Log of an Anti-Aircraft Battery in the Argonne," in *Liaison. The Courier of the Big Gun Corps,* Vol. I, No. 7 (1 February 1919), pp. 51-52. Also, Telegram, G-3 AEF to American A.A. School, Fort de Stains, 30 August 1918, which assigned the battalion to 1st Army. AAS Records, Reel 11. See Hq., Arty. Sec., A.A.A. School SO 123, 2 September 1918, in AAS Records, Reel 12. For H&S Co., see Ltr, CO H&S Co., 2nd AA Bn to CO, 2nd AA Bn, Subj: Report on Machine Gun equipment, 6 October 1918; and Ltr, CO H&S Co. to CO, 2nd AA Bn,

Subj: Par. 5, Memo. No. 9, Hqrs, 2nd A.A. Bn., Oct. 32st, 1918, dated 1 November 1918. AAS Records, Reel 15. For Battery A, see Ltr, CO Btry A, 2nd AA Bn to Hq. AAS, Subj: War Diary, month of September 1918, 1 October 1918; Ltr, CO Btry A, 2nd AA Bn to CO 3d Groupement Auto-Canon, Subj: Report of Firing, 13 October 1918; Ltr, CO Btry A, 2nd August to 3 October 1918, 3 November 1918. AAS Records, Reel 16. For Battery B: Ltrs, CO Btry B, 2nd A.A. Bn, to CO, 2nd AA Bn: Subj: Arrangements with French for Firing, 25 September 1918; Subj: Technical Report concerning Airplane brought down, 23 September 1918; Subj: Machine Gun Fire at Enemy Planes, 6 October 1918. Ltrs, CO Btry B, 2nd AA Bn, to Chief of AAS, 1st Army: Subj:Number of rounds of ammunition used, 1 November 1918; and Subj: War Diary, 1 November 1918. AAS Records, Reel 15.

[122] Conversation and correspondence with Col. Bird S. DuBois (U.S.A. Ret.), who commanded the 6th A.A. Battalion, and correspondence with Mr. William C. Cameron (formerly Sgt.), who served in Battery A, 3d A.A. Battalion, 1982-1983. Also Memorandum for ACofS G-1 from Chief of AAS, 7 November 1918. AAS Records, Reel 11.

[123] Correspondence with Mr. Charles J. Utterback (formerly Sgt.), who served in the 5th A.A. Battery, 1982-1983. CMH Lineage File, 5th A.A. Battery.

[124] Final Report of the Chief of Antiaircraft Service, pp. 216-217.

[125] Ltr, Hq. 1st AAMG Bn to Chief of AAS, 1st Army AEF, Subj: Summary of Operations, month of September, 1918, 1 October 1918. AAS Records, Reel 7. Ltr, CO 2nd AA MG Bn to Chief, AAS, 1st Army, Subj: Report, 1 January 1919. AAS Records, Reel 11. Also see Memorandum for Col. Hopkins from Capt. R. E. Lamb, Adjutant AAS, 4 September 1918, which discusses personnel requisitions. AAS Records, Reel 6. See Msg. No. 16785 (11 September 1918), GHQ AEF to AG, which requisitions 200 machine gunners for AA Service. In Koenig Papers, MHRC.

[126] Maj. Oliver J. Quane, *West of the Meuse* (Chicago: n.p., 1919), pp. 12, 42, 103.

[127] *Ibid.,* p. 11.

[128] CMH Lineage Files for the 3rd, 4th, and 5th AA MG Bns. Also see Telegram, G-3 AEF to CO, US Troops at Ligny-en-Barrois, 26 October 1918. AAS Records, Reel 11.

[129] Quane, *loc. cit.*

[130] Telegram, Secretary A.A.A. School to Chief of AAS, 29 July 1918. AAS Records, Reel 6. Telegram, G-3 AEF to CG Army Artillery, 15 July 1918. AAS Records, Reel 11.

[131] Quane, pp. 12, 103, 112.

[132] CMH Lineage File, 1st AA MG Bn.

[133] Ltr, CO 1st AA MG Bn to Chief of AAS, 1st Army, Subj: Operation Report, 4 September 1918. AAS Records, Reel 11. Final Report of the Chief of Antiaircraft Service, *op. cit.*

[134] Ltr, CO 1st AA MG Bn to Chief of AAS, 1st Army AEF, Subj: Summary of Operations, month of September, 1918, 1 October 1918. AAS Records, Reel 7.

[135] Ltr, CO 1st AA MG Bn AEF to Chief of AAS 1st Army AEF, Subj: Operations Report, 29 September 1918. AAS Records, Reel 5.

[136] [Office of the Adjutant General.] *American Decorations. A List of Awards of the Congressional Medal of Honor the Distinguished Service Cross and the Distinguished Service Medal Awarded Under Authority of the Congress of the United States, 1862-1926.* (Washington: U.S.G.P.O., 1927), p. 635. (Hereinafter cited as *American Decorations,*). Williamson was cited in WD GO 140 of 1918.

[137] Inclosure to Ltr, CG 1st Army to CO 1st AA MG Bn, Subj: Acknowledgement of Services Rendered, 10 October 1918. CMH Lineage File, 1st AA MG Bn.

[138] Hq., AAS, 1st Army, Report - Operations of Anti-Aircraft Machine Gun Battalions October 12 - November 11 - Inclusive,

7 December 1918. AAS Records, Reel 11. Also Telegram, Perkins to Chief of AAS, 30 November 1918. AAS Records, Reel 1.

[139] Telegram, G-3 AEF to CG, Advance Section SoS, 25 September 1918. AAS Records, Reel 11.

[140] CMH Lineage File, 2nd AA MG Bn.

[141] Quane, p. 100.

[142] *Ibid.,* p. 46.

[143] *Ibid.,* pp. 25, 31, 35-41, 49, 51, 57-8, 79, 92.

[144] Hq. AAS, 1st Army, Report of Operations of Anti-Aircraft Machine Gun Battalions October 12 - November 11 - Inclusive, 7 December 1918. AAS Records, Reel 11. Also Telegram, Perkins to Chief of AA Service, 3 December 1918. AAS Records, Reel 1.

[145] *American Decorations,* p. 623. Weitzenberg was cited in WD GO 128 of 1918. Also Ltr, CO A/2 AAMG Bn to CG, AEF, Subj: Recommendation of Sgt. George Weitzenberg for Distinguished Service Cross, 5 October 1918. AAS Records, Reel 19.

[146] *Ibid.,*, pp. 334, 592. Heath and Telfair were cited in WD GO 37 of 1919. Also Ltr, CO c/2 AAMG Bn. to CO, 2 AAMG Bn, Subj: Conduct of 2nd Lieut. Samuel F. Telfair and Lt. Laurel B. Heath, 20 November 1918, with inclosures. AAS Records, Reel 22.

[147] Memorandum for Chief of AAS, 1st Army, from Maj. O. L. Spiller, Hq. AAS, 25 October 1918. AAS Records, Reel 11.

[148] Hq. AAS 1st Army Report - Operations of Anti-Aircraft Machine Gun Battalions October 12 - November 11 - Inclusive, 7 December 1918; and Hq. AAS 1st Army Report on Operations for Period 25 September to 18 October 1918, 28 October 1918. AAS Records, Reel 11.

[149] Quane, pp. 34-35.

[150] Ltr, CO 1st AA MG Bn to Chief of AAS 1st Army AEF, Subj: Operation Report, 29 September 1918. AAS Records, Reel 5.

[151] Ltr, CO 4th Pursuit Group, 2nd Army, to Chief of AAS, 2nd Army, Subj: Fire from Ground on American Planes by American Troops, 6 November 1918, with indorsements; Ltr, CO 1st AA MG Bn to Chief of AAS, 2nd Army, 9 November 1918, Subj: as above. AAS Records, Reel 1.

[152] Secret Memorandum, Hq. Army Artillery, 1st Army AEF, 3 October 1918. AAS Records, Reel 11.

[153] Smith interview.

[154] Prospectus, A-A M-G. School, n.d., AAS Records, Reel 10.

[155] Hq. Chief of Air Service, 1st Army, Circular Number 1, 19 August 1918, "Routine Procedures." AAS Records, Reel 1. Also GHQ, Daily Table of Letters and Couleurs of Acknowledgement for the period of 1st October to 31st Inclusive, dated 23 September 1918. AAS Records, Reel 23.

[156] *American Decorations,* p. 298.

[157] Telegram, Chief of AAS, 2nd Army, to Chief of AAS, 9 November 1918. AAS Records, Reel 1.

[158] Telegram, G-3 AEF to CG, 2nd Army, 20 November 1918. AAS Records, Reel 11.

[159] CMH Lineage File, 1st AA MG Bn.

[160] Telegrams relating to the 2nd AA Bn; the 3rd, 4th, 5th, 6th, and 7th AA Bns; the 14th, 15th, 16th, and 17th AA Batteries; the 4th, 5th, and 141st AA MG Bns; the 5th, 11th, and 12th AA Batteries; the 13th, 18th, 19th, and 20th AA Batteries; and the 8th AA Sector; these and others are in AAS Records, Reel 11, all dated 18-28 November 1918.

[161] Memorandum from G-4, 2nd Army, to Chief of AA, 2nd Army, 24 November 1918. AAS Records, Reel 1.

[162] See DuBois correspondence; Smith interview. SO 191, Artillery Section, A.A.A. School, 2 December 1918, for example detached 21 Regulars from unit. AAS Records, Reel 12.

[163] Ltr, ACofS G-3, to French Military Mission, GHQ AEF, Subj: Withdrawal of French Anti-Aircraft Artillery, 21 November 1918; and Memorandum, Chief of AAS for ACofS, G-3, Subj: Semi-Mobile Anti-Aircraft French Units, 21 November 1918. AAS Records, Reel 11.

[164] Telegram, Connor to AA Service, 30 November 1918. AAS Records, Reel 1.

[165] For example, Ltr, Chief of AAS to CO, 8th AA Sector, Subj: Disposition of Ordnance Materiel, 29 November 1918, with Indorsements. AAS Records, Reel 6. Telegram, Chief of AAS to CO, AAD of APO 712, 28 November 1918. Similar communications were sent to all AA Sectors. AAS Records, Reel 6.

[166] Telegram, SOS No. 505-S, 25 November 1918. AAS Records, Reel 4.

[167] CMH Lineage Files, various. See also Ltrs, CO Btry A, 2nd AA Bn, to CG of Camp Dix, N.J., Subj: Discharge and Subj: Assignment to Posts of Regular Army enlisted men, various dates in December 1918. AAS Records, Reel 16.

[168] *Ibid.,* file for 1st AA Bn.

CHAPTER V

CONCLUSIONS

In February 1919 Col. Jay P. Hopkins, hastily relieved of his duties in the United States, went to Paris on General Pershing's recommendation as the American representative to the final Inter-Allied Anti-Aircraft Committee meeting.[1] Unlike previous meetings of the Committee, when Hopkins had commanded the A.A. Service, he was in 1919 completely unconnected with antiaircraft duty for the excellent reason that the Coast Artillery Corps of the Army no longer had an antiaircraft service. The meetings which he attended provided an excellent opportunity for retrospection, if nothing else, and an auditing of the accounts of the Antiaircraft Service of the A.E.F. was certainly in order.[2]

However successful American A.A. units in France may have been—and their successes were beyond dispute—the fact remained that the number of those units available for combat was always embarassingly small. The manning problems the Army experienced in the expansion programme of 1917 limited the size of the A.A. Service and restricted the number of trained, professional soldiers who could be spared for it. Allied to that, the continuing shortage of guns and equipment, whether American or French, further decreased the number of units that could be outfitted properly for duty at the front. The reasons which lay behind the American failure to field a larger A.A. force are certainly understandable ones. Nonetheless, the Allies hoped for more from the United States, and American bravado in early 1917 certainly led them to expect better than they got.

The fault, if it must be apportioned, lay with the authorities in the United States proper, for the soldiers of the A.E.F. made the most of everything they were given. The War Department's various agencies moved at a glacial pace, and the Ordnance Department was a near-perfect example of the type. The French were often blamed for the lack of antiaircraft weapons, but the French had been stretched to the limit and could hardly be asked to supply two armies with all of their various needs. As it was, the French did remarkably well, for no more than twenty-four artillery pieces of American manufacture ever wound their way to France, and among them no antiaircraft guns were to be found. Once American units were armed to the limit of the equipment available, any further air defense had to be provided by the French.

That, in the end, was what happened, and the French augmentation of the American A.A. Service was one of the least publicized aspects of the war. The French gunners actually outnumbered the Americans, as a glance at the troop lists for American First and Second Armies shows. In round figures, seventy-five French officers and 2,400 enlisted men were directly commanded by the A.A. Services of the two American armies.[3] By comparison, the American A.A. Artillery in those two armies could claim only about 1,000 men, although the 1,500 men of the two antiaircraft machine gun battalions made the totals more respectable.[4] When the French semi-fixed batteries dotted throughout the American sector are considered, however, it becomes clear that the A.E.F. was protected from German air power as much by Frenchmen as by Americans. It was small wonder that the A.A. Service took special note of the few occasions on which it was able to provide a similar service to the French. The German offensive of 1918 was an excellent case in point. When Paris was threatened, American units were summoned to repel the foe. One of them was Battery D, 1st A.A.

Battalion, attached for the course of the emergency to the Military Government of Paris. The services rendered by that battery were commended by the Military Governor of the city in a letter to the A.A. Service Headquarters—a letter carefully preserved in the A.A. Service records and forwarded in facsimile to the G.H.Q.[5] In the main, though, the assistance ran the other way, and Americans were understandably sensitive about it.

Those Americans who did fight, fought well, and their conspicuous success in shooting down airplanes demands some explanation. When Maj. Thomas F. Hudgins, the final Director of the Artillery Section of the A.A.A. School, wrote an historical summary of the School's operations, he attributed the results obtained at the front to the quality of training given by the School. He compared the American methods favorably to those of the British, writing that

> There is no reason to suppose that unscientific methods of fire control would have been more successful for Americans than they proved for . . . our allies in the early days. This comparison would indicate that results obtained are greater than ten to one in favor of the most scientific instruction possible, and that this is a measure of the School's value.[6]

There is no question that the "scientific" approach to antiaircraft gunnery was the proper and forward-looking one, as both Gen. James Shipton and Col. Jay Hopkins repeated throughout 1917 and 1918. The record certainly bore them out when comparing American gunnery to the British methods. On the other hand, American techniques *were* French techniques, and Americans used French equipment. There should therefore have been no discernable difference between American and French antiaircraft records. Yet Americans also outperformed their Gallic allies.

No very clear reason for that distinction has emerged. It may be that the more thorough training lavished upon the American soldier by the A.A.A. School was responsible for the generally higher rate of aircraft downings by American units. Alternatively, the proverbial American gamesmanship, competitiveness, and aggressiveness may have been the deciding factors. It may simply have been that the Americans, at that particular point in the war, brought to a front line rich in targets all of those traits and a freshness and eagerness to fight that the Allies had largely lost. Whatever the reason, the A.E.F. accepted the quality of its A.A. Service as a given, and the Army only began to remark upon it some years later.

Nonetheless, the real accomplishments of the A.A. Service were not spectacular. World War I was a war in which no nation ever managed to establish aerial supremacy—Germany remained a power in the air to the end. When the Air Service could not provide complete protection, as it could not, and fighters could not be vectored to intercept the enemy because no communications equipment existed to make that possible, Antiaircraft protection became more important. It was the only means of defense available to prevent the enemy from bombing, strafing, and observation when no friendly fighters were about. Such accomplishments cannot be quantified or measured. The achievements of the A.A. Service when viewed from the perspective of later years are greater, and also have little to do with the number of airplanes it shot down. The A.A. Service was a tiny counter in the balance of forces at war in 1917 and 1918, and its immediate war-time services probably had very little to do with the outcome of any battle. Had the A.A. Service not existed at all, the results would surely have been very much the same, although American casualties might easily have been greater. The value of the Service to the Army was instead in the lessons it learned and the tactical doctrine it evolved. The A.A. Service of World War I created, in all important respects, the air defense doctrine still in use by the Army.

When Gen. Shipton and Col. Hopkins gave their antiaircraft units the mission to protect the troops and facilities of the A.E.F., rather than to hunt airplanes, they also gave the future Air Defense Artillery its mission. Shipton and his staff believed that "the purpose of anti-aviation defense is to protect our own forces and establishments from hostile attack and observation from the air," chiefly by keeping "enemy aeroplanes at a distance."[7] The real key to all of this in World War I was field and heavy artillery. The airplane had not yet become the terrible weapon into which it would develop by 1945. The damage that could be done even by bombers was relatively minimal, although Gen. Sir Hugh Trenchard's Independent Air Force began to show the way by late 1918. Artillery was the real killer of the war, and the concerns of anti-aviation defense centered upon preventing the artillery spotter aircraft from doing their jobs efficiently.

The A.A. Service affirmed that decision in everything it did. Major jobs for A.A. units at the front began with protection of observation balloons, used for registering artillery fire. The units which had first-rate equipment were assigned to the front, not to rear-area installations, where only aircraft could be a threat. Antiaircraft machine gun units were never assigned to rear areas, except for one brief exception. When searchlights were in short supply, the front was given priority in receiving them. It is clear that rear area defenses were very much a secondary concern to the A.A. Service. The situation is little changed today, for although airplanes themselves have become much more deadly, the antiaircraft arms still are organized to protect the troops on the ground, rather than shoot down aircraft. The present doctrine states that the mission of Air Defense Artillery is

> To nullify or reduce the effectiveness of attack surveillance by hostile aircraft . . . thereby supporting the primary army function of conducting prompt and sustained land warfare operations.[8]

All of the elements of tactical doctrine used by the A.A. Service are likewise elements of present Army Air Defense Artillery doctrine. One of the air defense lessons reinforced by the experience of Vietnam was the "importance of deploying a mix of complementary air defense weapons systems . . . "[9] The other basic principles and employment guidelines of air defense today sound very much like those used in 1918 too: use of antiaircraft weapons in mass and in a proper mix, mobility, integration of defensive efforts, balanced fires, weighted coverage, mutual support, overlapping fires, early engagement, and defense in depth. At the close of World War I, Capt. Glenn P. Anderson even suggested the secondary role for A.A. guns that was to become prominent in the Second World War—their use as anti-tank weapons.[10] All of those techniques were first tried and used in World War I and, having been proved sound, retained in the years since.

A few aspects of tactical doctrine have been amended since 1918. The use of point defense was general in 1918, and was confirmed by the Army in the 1920s and 1930s. The Army regarded A.A. as relatively short-ranged and immobile and saw it was the final, close-in barrier to air attack on sensitive points.[11] The Chief of Coast Artillery believed that aircraft avoided defended areas, and considered that "it is extremely doubtful whether bombing would ever seriously damage harbor defenses." In fact, "protected by antiaircraft artillery by day and shrouded in darkness at night, the permanent coast defenses have little to fear from the enemy's bombing planes," he predicted.[12] Point defense remained the doctrinal solution to the protection of many types of installations thereafter, but has been supplemented in specific situations by area defense and a linear, or belt, defense.[13] Volume of fire is still the correct technique in small arms firing at aircraft, but barrage fire has been discarded because of progressive improvements in the accuracy of antiaircraft guns. As late as March 1945, though, during the massive A.A. operation to protect the Remagen Bridge and bridgehead, barrage fire was used at night.[14]

Air Defense Artillery, surely among the most highly technical of the arms, might well be expected to have experienced the most sweeping changes in tactical doctrine because of advances in technology. The surprising fact is that air defense tactics in 1984 are very much as they were in 1918. Those changes which have taken place are more changes of degree than of kind, because the fundamental problem confronting the gunner remains the same. He still must fire his weapon toward a point at which the aircraft is predicted to be. No revolutions in technology have taken place which require revolutionary changes in tactics. The airplane of 1984 is faster and more deadly than the airplane of 1918, but it flies in much the same way, according to the same physical laws, on much the same sorts of missions. Similarly, the air defense missile remains a projectile, albeit a guided projectile, attempting to accomplish the same end. Biplane or supersonic jet, 75-mm shell or guided missile, the basic problems are similar. The tactics of 1984 are therefore such that they would be immediately recognizable by the men of 1918.

The great service of Gen. James A. Shipton, Col. Jay P. Hopkins, Capt. Glenn P. Anderson, and the other fathers of the present Air Defense Artillery, was thus that they recognized and analyzed the air defense problem and provided the basic tactical solution to it. Barring a significant change in the way airplanes fly, the way projectiles are guided, or the use of airplanes at all, their solution seems likely to be the basis of tactics for the foreseeable future. The second service they rendered was no less significant. They grappled with the administrative problem of creating a new branch ofservice for the Army, and pointed the way to the foundation of an arm which could deal with the problem of defense against airplanes.

Because the airplane as an instrument of war was a new development in World War I, the Army had no service which could cope with the business of defending against it. The existing types of combattant arms had all been created long before the United States Army existed, and the Army had never before been confronted with the task of creating a new arm. The complexities of fighting the battle against airplanes from the ground demanded the creation of an equally complex force, and none of the branches had the means, organization, or training to do the job. Shipton and his staff, admittedly borrowing heavily from the experience of the Allies, founded such a force.

No one arm disposed of the requisite resources, so the A.A. Service blended the necessary elements of three of the traditional arms to meet the needs of the day. The Coast Artillery Corps was the arm into which the most mathematically inclined officers of the day were commissioned, and was in 1918 almost sinfully proud of its technical brilliance.[15] The C.A.C. was the artillery arm which had made gunnery against moving targets its especial province, and from it were drawn the artillery troops for the A.A. arm. The Infantry had developed a particular appreciation for the capacities and use of the machine gun, so it was the branch which provided the troops to man the machine gun battalions for low altitude air defense. For purposes of night combat, the Corps of Engineers, the service which was experienced in field searchlight duty, was best trained to develop the A.A. searchlight units.

All of this is obvious in retrospect, but the careful blending of the three branches in 1917 required of the men in charge a clear appreciation of the technical and tactical problems involved and a resolve to make the unwieldy combination work under the stresses of duty in the field. As Col. Jay Hopkins wrote after the war, unified tactical control of the disparate branches was achieved despite, not because of, the administrative complications of causing units to work together which had never served together before.[16] Hopkins saw that such an *ad hoc* arrangement would not meet future needs, and made recommendations which were eventually realized when the antiaircraft mission became a major task assigned to the Coast Artillery Corps. "All of the troops of the Antiaircraft Service are so intimately related in tactical operations," he said, "that they should be taken from, or form, a single branch of the service." That branch, he believed, should be the Coast Artillery Corps, because the experience of the World War had shown that artillery was the dominant factor in air defense.[17] The eventual antiaircraft regiment of the Coast Artillery Corps confirmed his ideas in its structure. The three battalions combined guns, searchlights, and machine guns in one tactical unit. The A.A. mission moved to the fore in the Coast Artillery Corps, becoming at least as important as the Harbor Defense mission, and having equal or greater prestige. The impetus for the clear delineation of A.A. function was the series of battleship bombing tests conducted by the Air Corps in the 1920s.[18] By the end of the decade the A.A. was effectively, if not officially, a separate arm within the C.A.C. At last, in 1968, air defense was separated into an arm organized strictly for that purpose, as Col. Hopkins had thought necessary fifty years before.

Finally, the case of the Antiaircraft Service of the American Expeditionary Force offers an opportunity to review the isue of coping with the military applications of new technological advances. The problem consists of more than just devising an appropriate technical response to a technical threat. It reaches beyond the realm of engineers and scientists and requires subjective, as well as mechanical, analysis. In the first place, some one at an appropriate level in the hierarchy of government must recognize, or be convinced about, which parts of a given complex of technology constitute a real military threat. Then, having done that, some one must have the will to order that the appropriate response be made. Only then, with the parameters of the problem clearly defined, do the scientists and engineers enter the process. Without such direction, their efforts are likely to prove erratic, expensive, and unsatisfactory.

When aerial machines became common, just such a problem arose to bedevil the American government. The airship had a long history of military application stretching back to the American Civil War and an equally long period of technical evolution. It was powerful, had a long range, could carry heavy loads, and was fast. At a time when airships could offer all of those characteristics for military use, the heavier-than-air craft was new, fragile, and had no load-carrying ability. A great many military writers attempted to predict the ways aircraft would be used in war, but few wasted much ink on the airplane—their focus was upon the airship. The poor performance of military airplanes before the war confirmed that judgment.

The consequence was a perfectly reasonable and logical, but nonetheless wrong, selection of a threat against which to defend. As a result, the American Army was unprepared to deal with the airplane when it, and not the airship, revealed itself to be the real military weapon. The first lesson to be gleaned from the story, then, is that it is not always easy to pick out the dangerous items from the spectrum of new technology, and that the process of making such choices is a responsible and demanding one, perhaps even more important than devising the technical response.

Once some far-sighted individual has made a decision that, for example, the airplane is the future threat and must be provided against, it remains to persuade the Army that the decision is a correct one and merits the use of part of a limited budget. Military institutions are by their nature cautious and conservative, inclined to retain the tested and true in preference to the strange and new. For various reasons of that ilk, armies were suspicious of the rifled musket, automatic weapons, and the use of the internal combustion engine. The eventual, but extended, demise of the horse cavalry in the United States Army is one of the surest indications of the Service's conservative and traditionalist inclinations.

The airplane met similar objections, both in terms of its use and of defense against it. One reason the A.E.F. had no American antiaircraft guns was the continued reluctance of the Army to be persuaded that the flying machine could be dangerous to troops on the ground. By the same token, military vested interests, probably reinforced by the Army's general unwillingness to take the airplane seriously, also hampered development of A.A. weapons. Disputes betwen the Ordnance Department, which designed guns, and the Coast Artillery Corps, which used them, insured that the 3-inch A.A. gun, the development of which did not begin until 1915, did not reach American troops in France.

The last step in dealing with a new technical wrinkle is generally the least demanding. Once the basic problems have been defined and the basic decisions made, some suitable means to counteract the new technical threat can be invented. As a rule, responses to technical threats have fallen into two classes. A new technical weapon may be invented to oppose the original danger—the best examples are the tank *vs.* anti-tank gun and radar *vs.* electronic countermeasures. The other solution is to counter the new weapon by modifying tactics to allow for it. In that case the most persuasive example was the evolution of infantry tactics demanded by the increased firepower or rifled weapons and, later, automatic weapons. Defense against aircraft has followed the former procedure, by and large, because the developing aerial threat has been met by increasing the sophistication of the weapons A.A. units have used, while tactics have remained little changed.

The Antiaircraft Service of the A.E.F. provided the best example in modern times of the problems inherent in dealing with the military applications of technology. The issues, the pitfalls, the personal and institutional rivalries, and the technical and administrative problems have all been rendered clear by the passage of time. Equally important as the need to exercise care in deciding what future weapons will be is another lesson of the case of the American A.A. Service. Good, patriotic, well-intentioned men can, on the best of evidence, still make wrong decisions.

The Air Defense Artillery of the United States Army began its existence as an arm with an antiaircraft mission in June 1917, through the efforts of a small but determined group of professional officers. Those men saw the need for a new branch of service to defend the Army in the field from attacks from the air, and they organized such a branch, independent in all but name. Formalization of their work did not wait many years. Furthermore, the officers of the A.A. Service set the doctrine for A.A. employment which is still, in most of its essentials, in use. They also recognized many of the problems, such as determining whether an airplane is friend or foe, with which the Air Defense Artillery and the Air Force are still struggling. Finally, they led a small but extremely proficient A.A. force in all of the A.E.F.'s major campaigns. Although their branch appeared to have been deleted and their efforts appeared to have been neglected after 1918, their work did survive. Few officers can claim such enduring influence.

ENDNOTES

[1] Hopkins Cullum File. Confidential Memorandum for Chief of Staff, U.S.A., from Pershing, 9 February 1919. AAS Records, Reel 11.

[2] The Final Report of the Chief of Anti-aircraft Service was a slender document which avoided controversial issues.

[3] Ltr, 2nd Army DCA, Chef d'Escadron Poncet, to The Colonel in Command of The Anti-Aircraft Artillery of the 1st American Army, 1 November 1918. AAS Records, Reel 7.

[4] Final Report of the Chief of Anti-aircraft Service, *op. cit.*

[5] Troop Hq., Arty. Section, A.A.A. School SO 87, 28 June 1918. AAS Records, Reel 12. Ltr, le General de Division Dubail, Gouverneur Militaire de Paris, Cdt. les Armees de Paris, to AAS Hq., 26 May 1918. "Ordre Particulier." AAS Records, Reel 5.

[6] Ltr, Director Arty. Section, A.A.A. School, to Hq., Army Schools, Subj: History of the School, 30 November 1918. AAS Records, Reel 4.

[7] Notes on A.A. Service Compiled by Shipton, Hopkins, and Anderson, n.d. AAS Records, Reel 7.

[8] Field Manual 44-1, U.S. Army Air Defense Artillery Employment, 31 December 1981, paragraph 1-1. The documents from which FM 44-1 is derived are JCS Publication 8, Doctrine for Air Defense From Overseas Land Areas; and JCS Publication

9, Doctrine for the Unified Defense of the United States Against Air Attack.

[9] *Ibid.,* paragraphs 1-2, 1-4.

[10] *Ibid.,* paragraphs 2-8, 2-9. Anderson, "With the Anti-Aircraft in France," *op. cit.*

[11] Addington Papers, MHRC. Also see Maj. Stewart S. Griffin, C.A.C., "The Infantry and the Coast Artillery—an Air Defense Team," in *Infantry Journal,* Vol. 36 (June 1930), pp. 578-579.

[12] Source material from the Chief of Coast Artillery, Aug. 10, 1933, "Aircraft Avoid Areas That Are Protected by Anti-aircraft Artillery," AWC Records, MHRC.

[13] FM 44-1, paragraph 2-6.

[14] "The A.A. Defense of Remagen Bridgehead," in *Coast Artillery Journal,* Vol. 88 (May-June 1945). Also see Ben J. Cothran Papers, MHRC, which contain maps and after-action reports on the Remagen operation.

[15] According to Brig. Gen. Joseph S. Robinson, USMA Class of June 1918. Robinson was commissioned into the Coast Artillery Corps and served chiefly in A.A. units. Interview, May 1983.

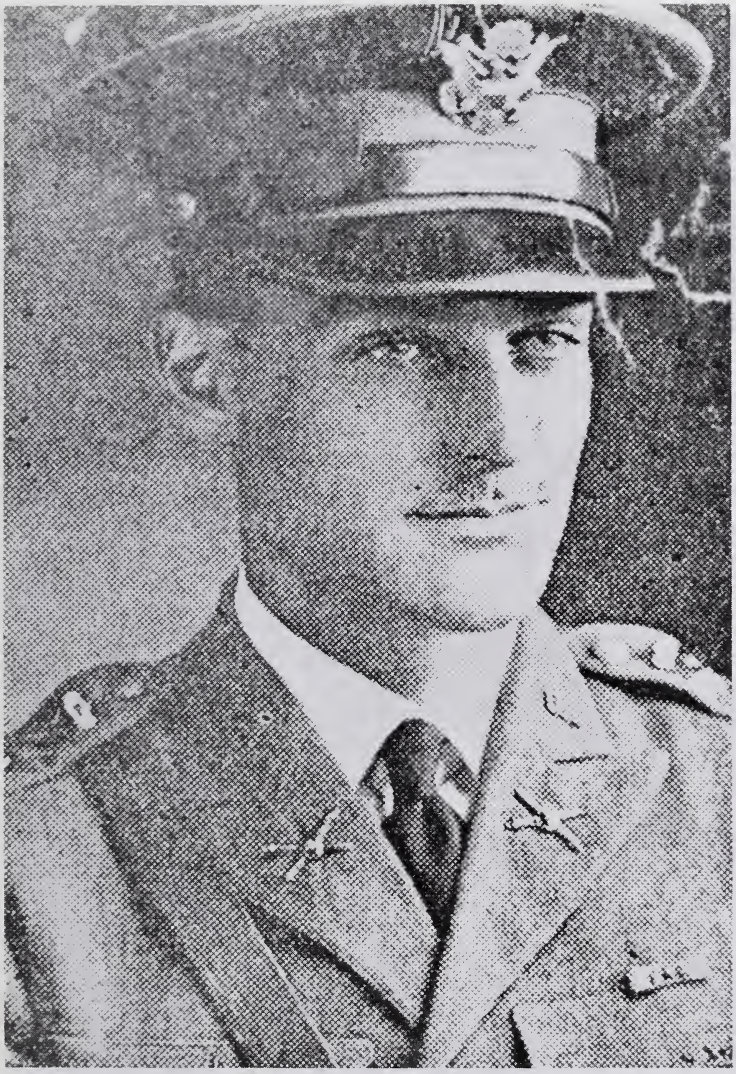
[16] Memorandum, Hq. AAS for ACofS G-5, 19 December 1918. AAS Records, Reel 8.

[17] *Ibid.*

[18] See "The Coast Artillery Corps," in *Coast Artillery Journal,* Vol. 65 (November 1926), p. 457. Also see Addington Papers, MHRC; and MS in W. C. Foote Papers, "The Anti-aircraft Artillery Journal and its Influence on the Development of the Coast Artillery Corps of the United States Army," 1953, MHRC.

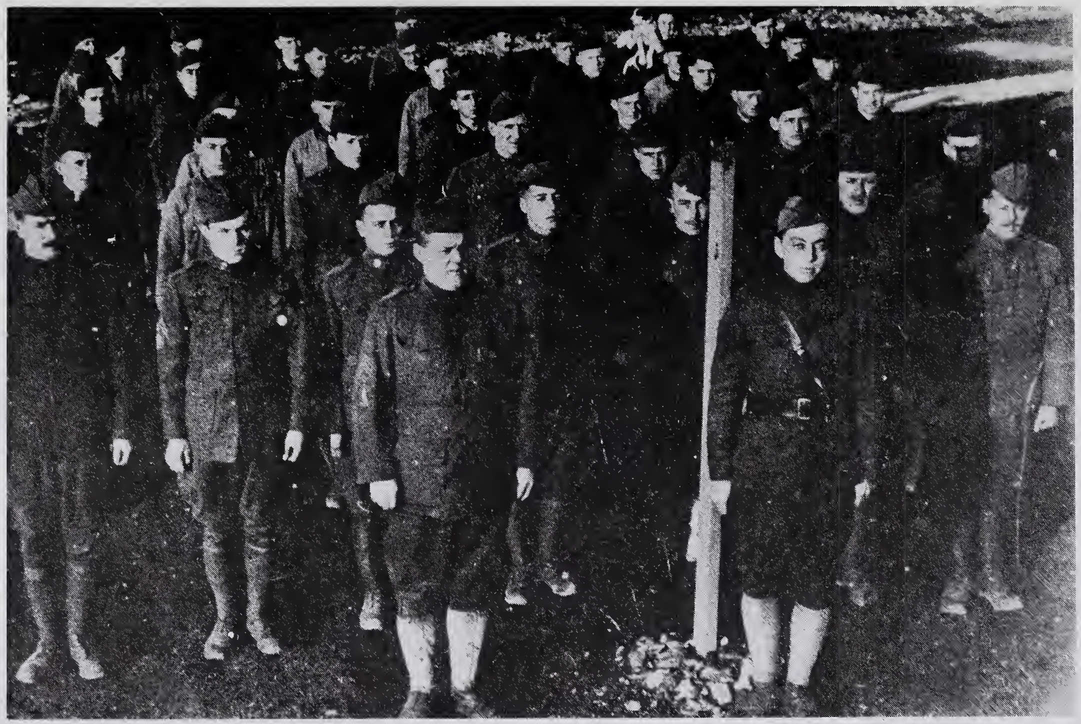
Brig. Gen. James A. Shipton, D.S.M. First Chief of Anti-Aircraft Service and father of the Air Defense Artillery. He created the arm and commanded it through June 1918.

Col. Jay P. Hopkins, D.S.M. Chief of A.A. Service from June 1918 through the end of the war, he commanded the A.A. units during their combat duty.

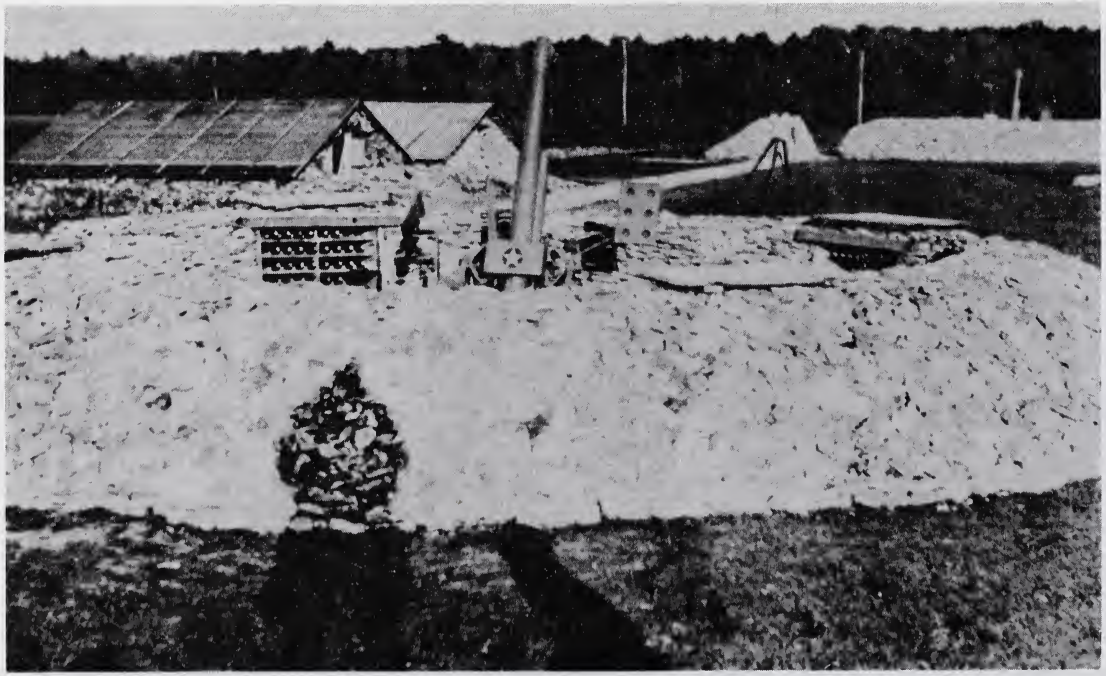


Captain Alvin C. Smith, who commanded Battery A, 1st A.A. Battalion (C.A.C.)

2nd Lt. Samuel F. Telfair, Jr., D.S.C. Assigned to Company C, 2nd A.A. M.G. Battalion, Lt. Telfair was one of four members of the A.A. Service to be decorated with the Distinguished Service Cross.

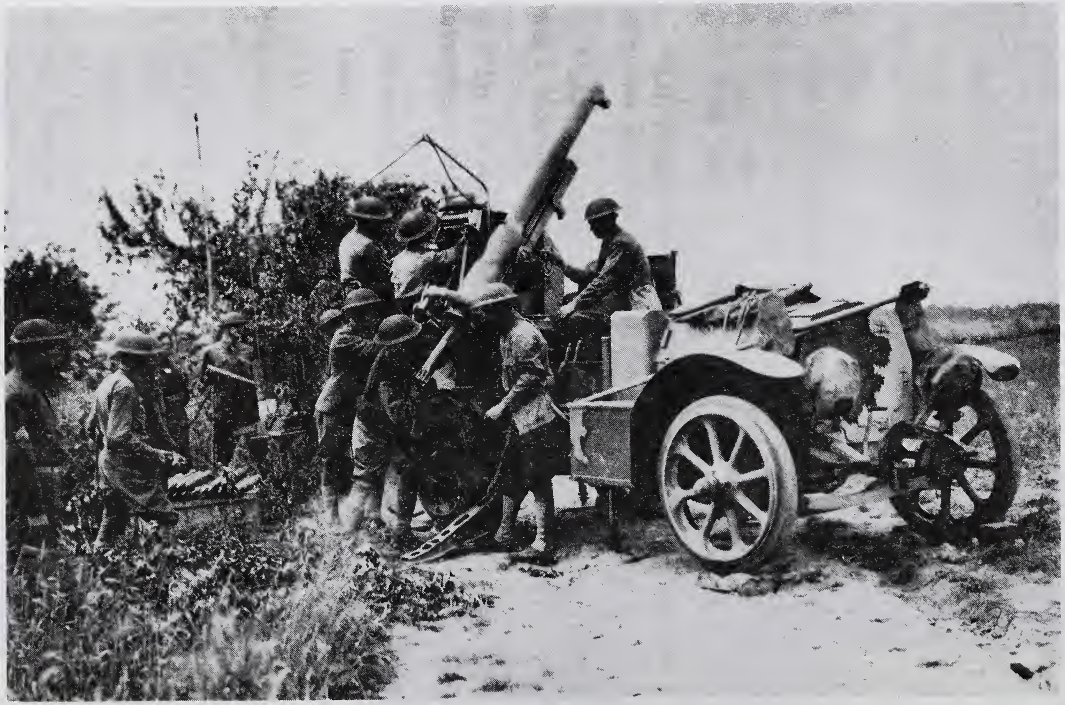


2nd Lt. D. M. Campbell (second from left, front) and men of the 1st Provisional A.A. Battery, A.A. Defenses of the G.H.Q. at Chaumont.

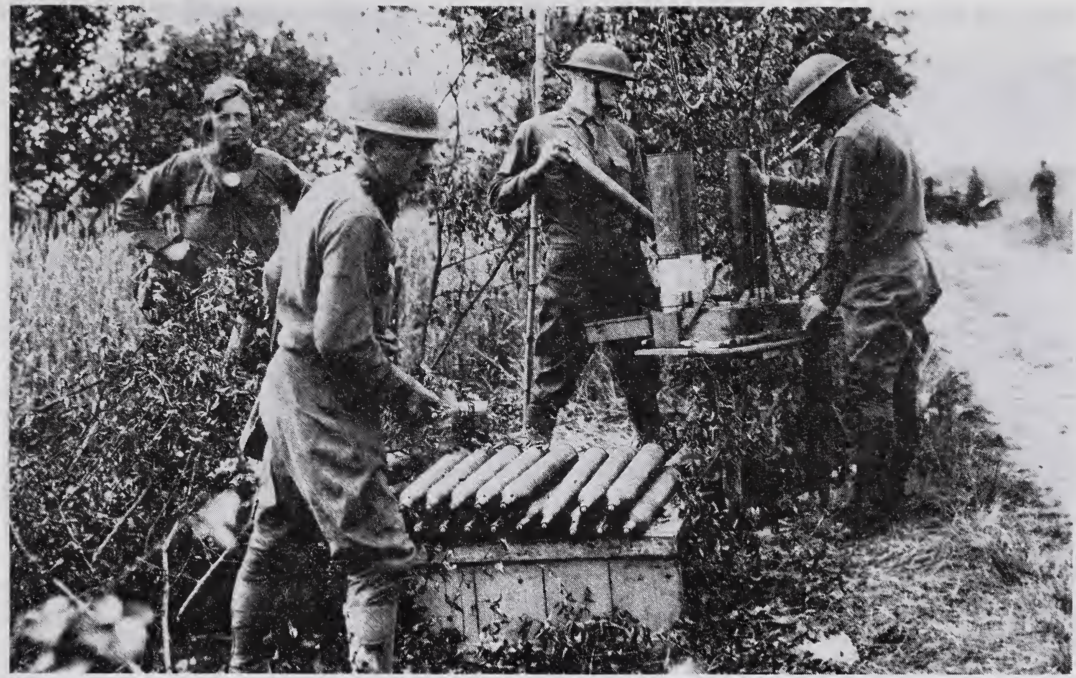


The two guns of the 1st Provisional A.A. Battery at Chaumont. The 75-mm guns were mounted on U.S.-designed improvised mounts.

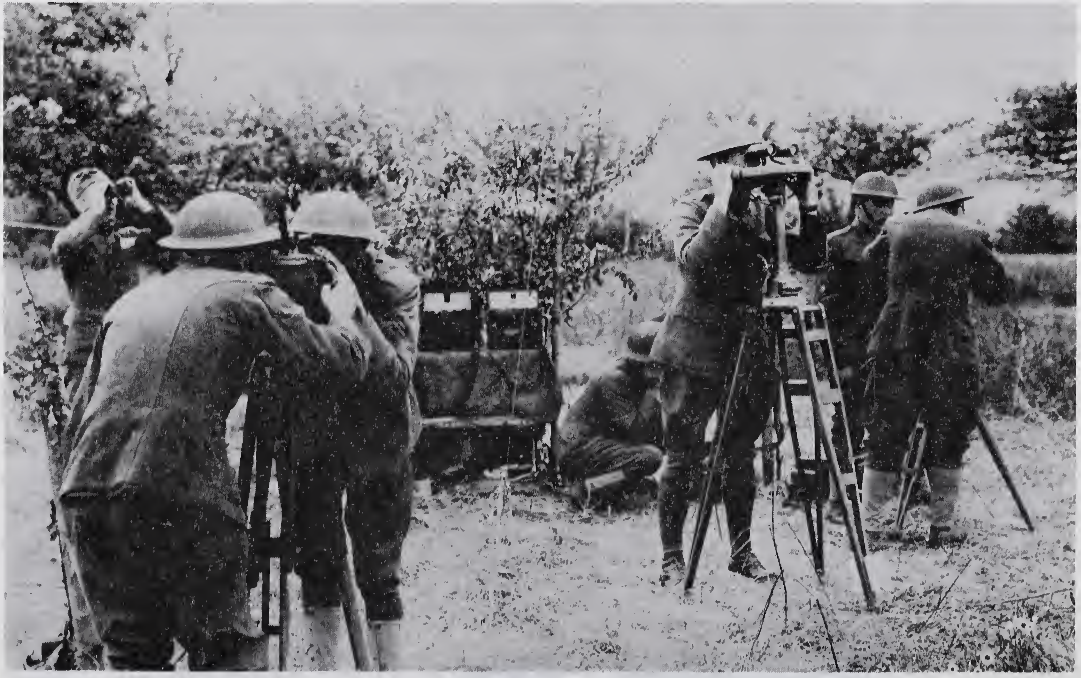
Auto-Cannon of the 1st A.A. Battalion in action. The gun is in full recoil and the gunners are firing at the maximum rate.



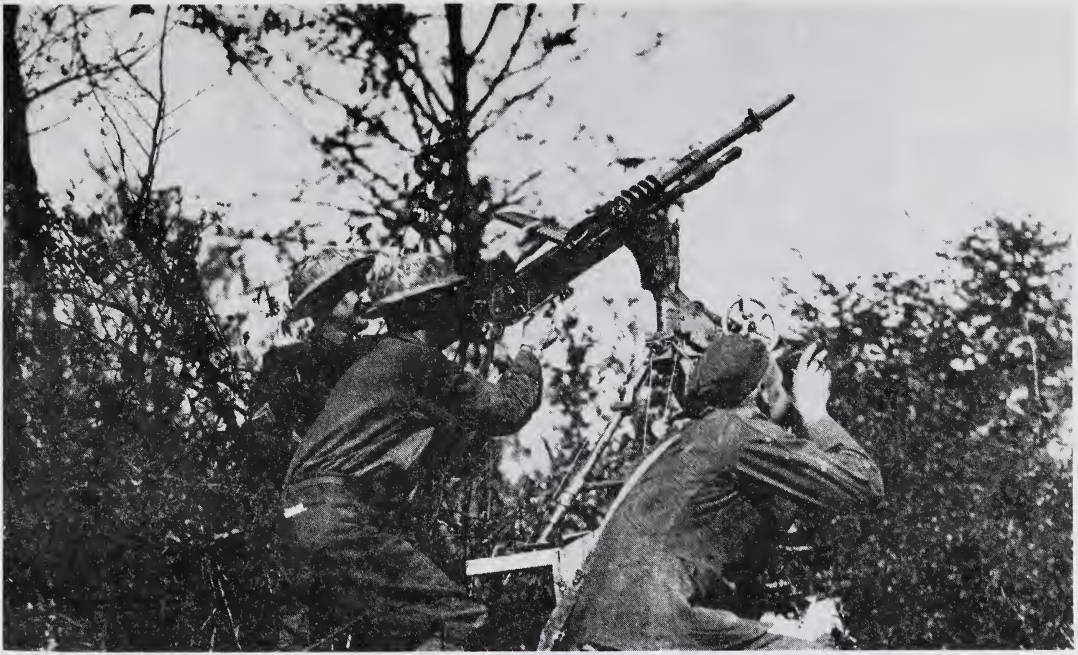
Battery B, 1st A.A. Battalion, in action at Montreuil, France, 15 June 1918. Gun commander, a sergeant, stands at left.



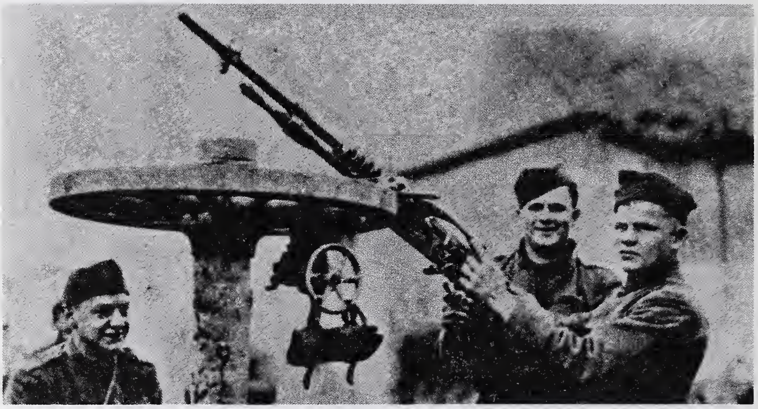
Battery B, 1st A.A. Battalion. Ammunition party and fuze-setting table. The battery's second gun is just visible in the distance, right.



Battery B, 1st A.A. Battalion. Tracking party with the battery commander standing at center. The two men at left are operating the Brocq Corrector, which computed the data necessary to aim the gun.

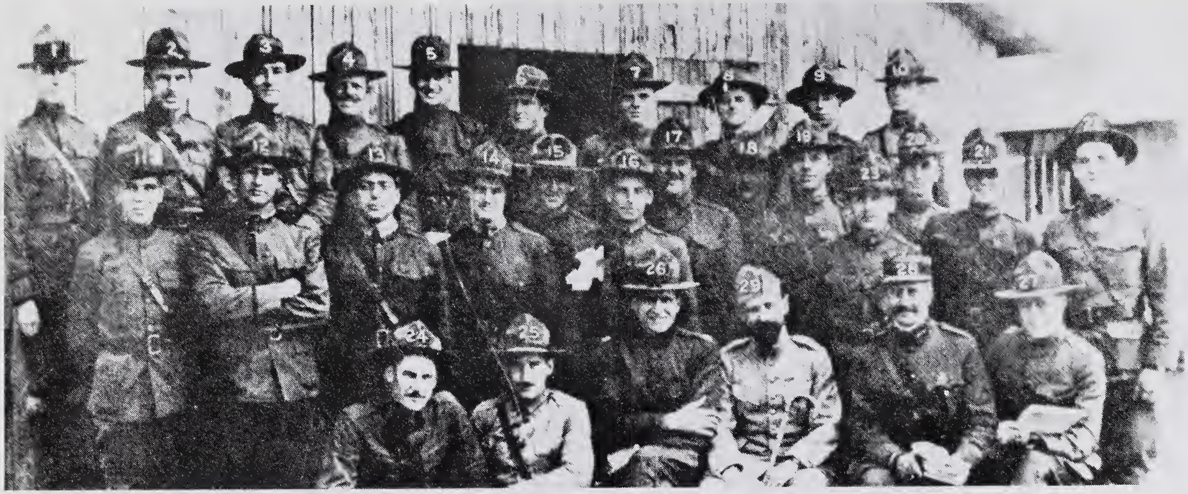


Antiaircraft Machine Gun in action on the Meuse River, 29 October 1918. An especially good shot of the Hotchkiss gun in an antiaircraft mount.



Hotchkiss machinegun adapted to air defense.

The more usual improvised mount for an antiaircraft machine gun.

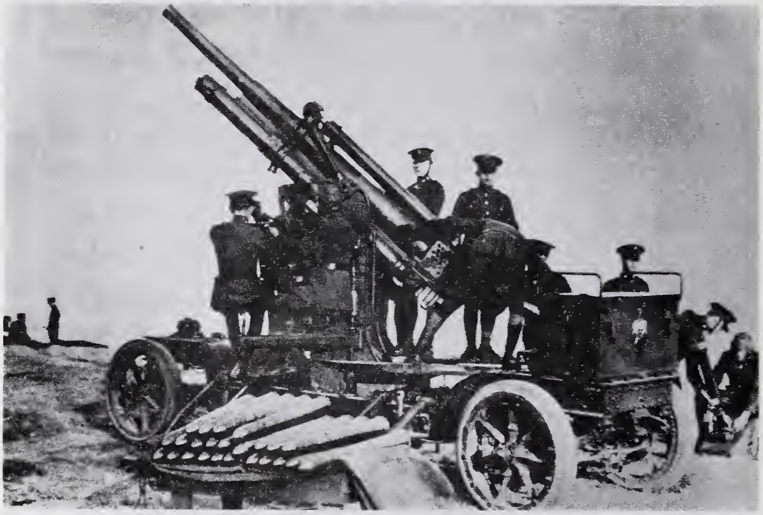


1. 2nd Lt S.C. Deitrick Jr.		Va
2. 1st Lt J.M. Lewis	Pittsburg,	Pa
3. 2nd Lt I. Wynne	Providence,	R.I.
4. 1st Lt W.S. Barker	Harrisburg,	Pa.
5. 2nd Lt R.O. Edwards	Cincinnati,	Ohio
6. 2nd Lt O.J. Miller	St. Louis,	Mo.
7. 2nd Lt. J. Jenkins	Norfolk,	Va.
8. 2nd Lt. W. Haskath	Providence,	R.I.
9. 1st Lt. J.H. Ewell Jr.	Goliad,	Texas
10. 2nd Lt. E.R. Holland	San Antonio,	Texas

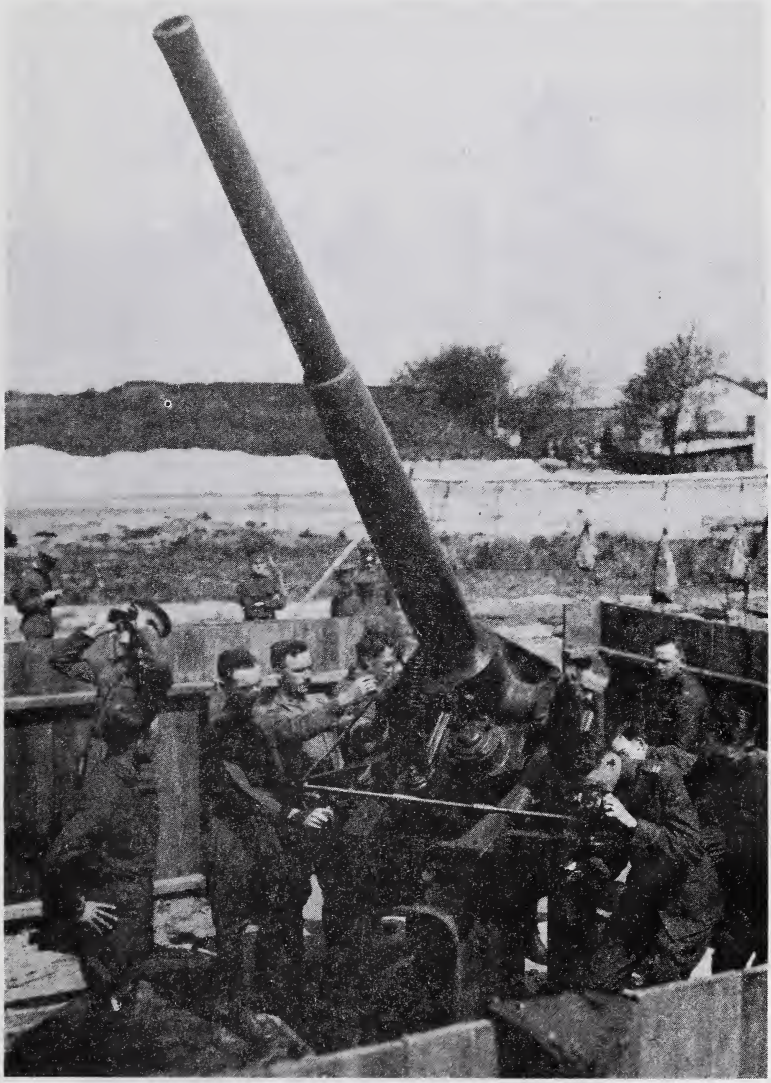
11. 2nd Lt. B.F. Harmon	Boston,	Mass.
12. 2nd Lt. C.W. Lawrence	Boston,	Mass.
13. 1st Lt. F.W. Mitchell	Ohiopyle,	Pa.
14. 2nd Lt. D.F. Taylor	Indianapolis,	Ind.
15. 2nd Lt. R.E. Glasheen	Brockton,	Mass.
16. 2nd Lt. A.C. Dixon	St. Louis,	Mo.
17. 1st Lt. H.K. Webb	Philadelphia	Pa.
18. 2nd Lt. S. Shillig	Port Gibson,	Miss
19. 1st Lt. A.F. Hull	Marshalltown,	Ia.
20. 1st Lt. W.V. Brenizer	Austin,	Texas

21. 1st Lt. J.H. Cochran	Little Rock,	Ark.	
22. 2nd Lt. W. Tower		Mass	
23. 1st Lt. D.S. Ward	Queens, N.Y.		
24. 2nd Lt. A.W. Chapman	Bay St. Louis	Miss	
25. 1st Lt. H.M. Marsh	Washington,	D.C.	
26. Capt 'Humbert	Annapolis		Instructors
27. Capt G.P. Anderson	West Point		
28. Capt Gacier	Paris		
29. Capt Rollet	Paris		

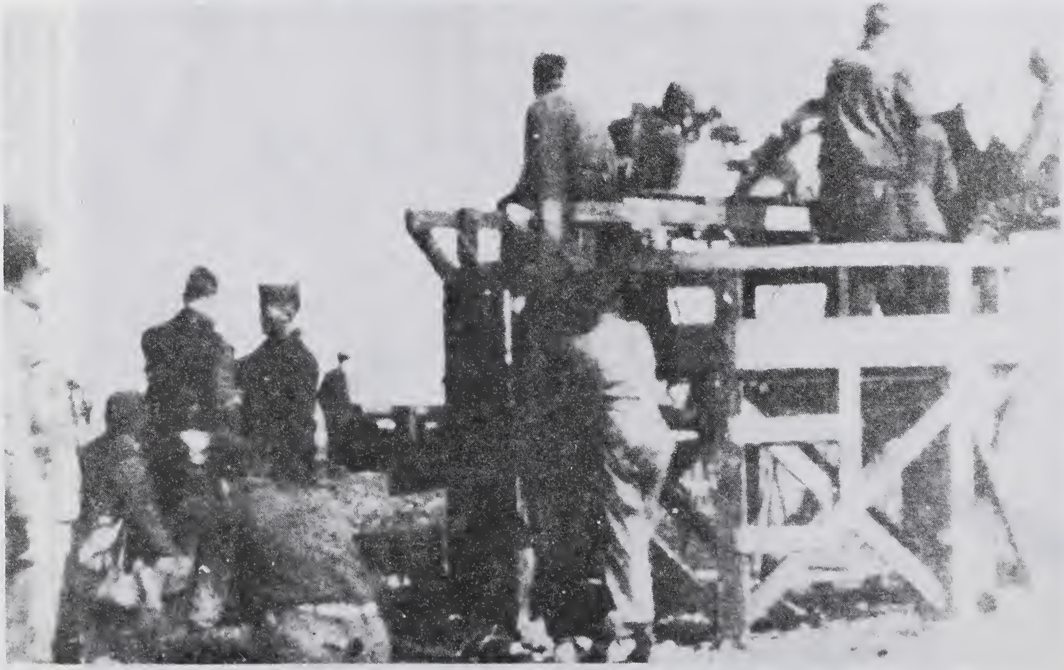
The first officer class at the American A.A.A. School in France, October 1917. These were the first officers in the Army to be assigned to A.A. duty. Capt. George F. Humbert is third from left, front row. Next to him are Capt. Paul Gassier, Capt. Charles Rollet, and Capt. Glenn P. Anderson.



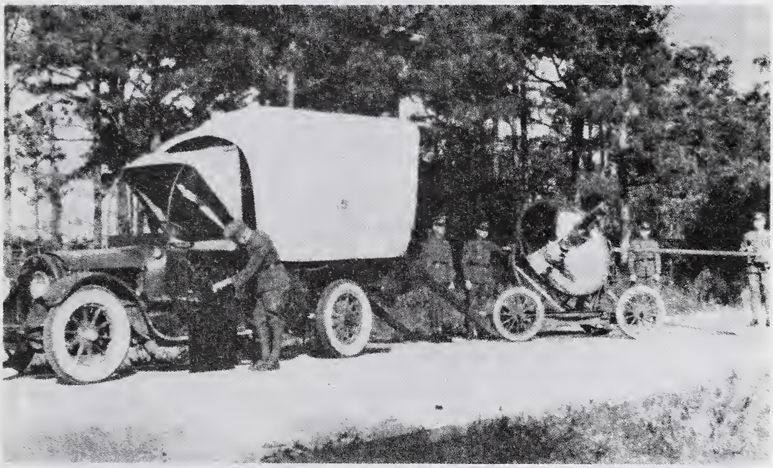
The gun they never got. The 3-inch mobile A.A. gun based on the 50-calibre M 1898 Seacoast Gun of relatively low muzzle velocity. It was relatively stable as mounted on a flatbed trailer. This particular weapon is in the hands of the gunners of the 61st Coast Artillery (A.A.) sometime in the early 1920s.



The other gun they never got. The A.A. Gun M 1917, designed with the idea in mind of protecting coastal fortifications from dirigibles. Ordnance began work on this static weapon in 1915, using up stocks of the old 3-inch, 55-calibre M 1903 Seacoast Gun. This gun is at Ft. Monroe, Virgina, being used to train a class of Coast Artillery officers.

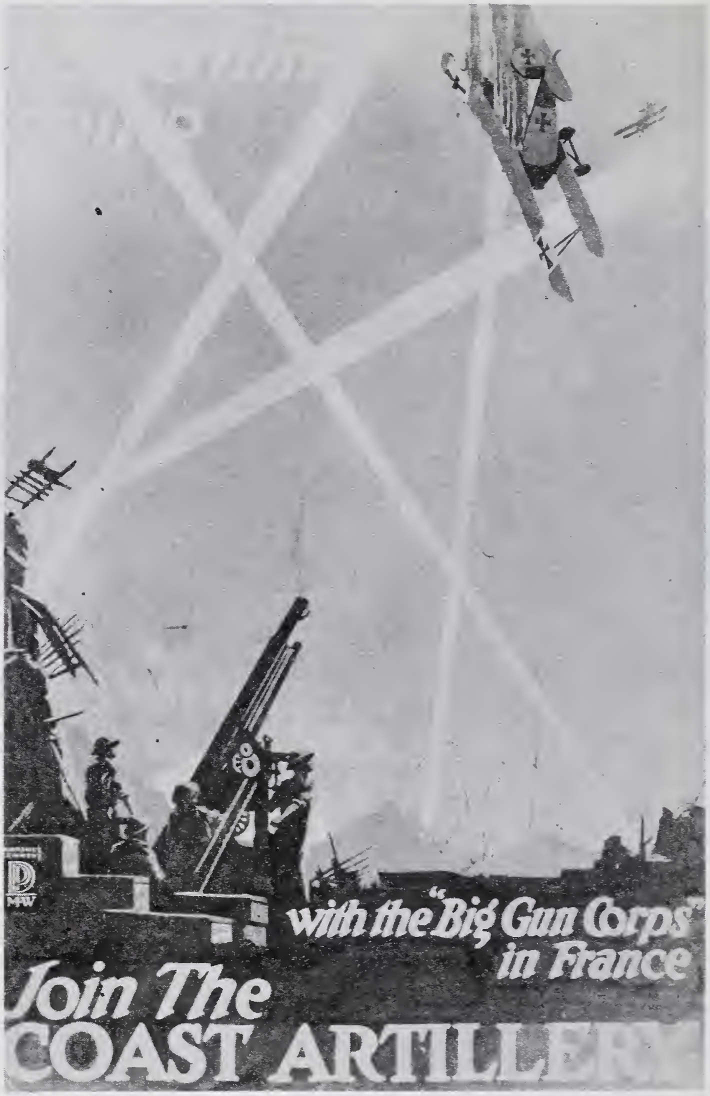


The improvised mount for the 75mm A.A. gun, which could be laid accurately neither in elevation nor in deflection. This gun was used throughout the rear area defenses of the A.A. Service.



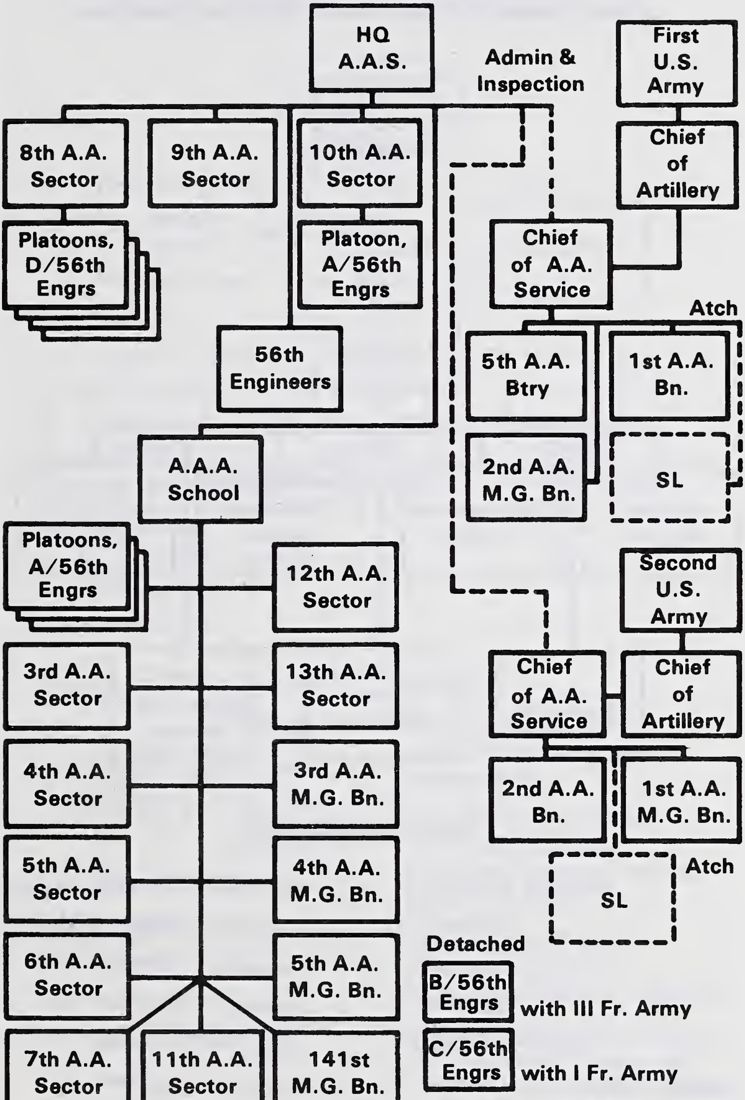
Cadillac 60-inch searchlight.

The American 60-inch searchlight as used by the 56th Engineers.


with the "Big Gun Corps" in France
Join The
COAST ARTILLERY

Glamor—the first recruiting poster for the antiaircraft artillery sought to induce young men to enlist in the Coast Artillery Corps for duty in France.

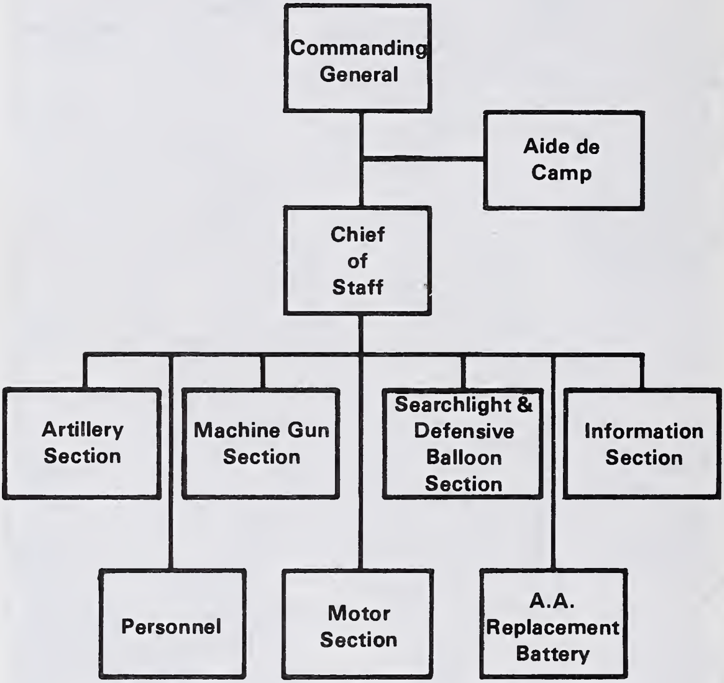
ORGANIZATION OF A.A. SERVICE, A.E.F.
(November 1918)



Solid lines indicate command.

ORGANIZATION

Headquarters, Antiaircraft Service, A.E.F.

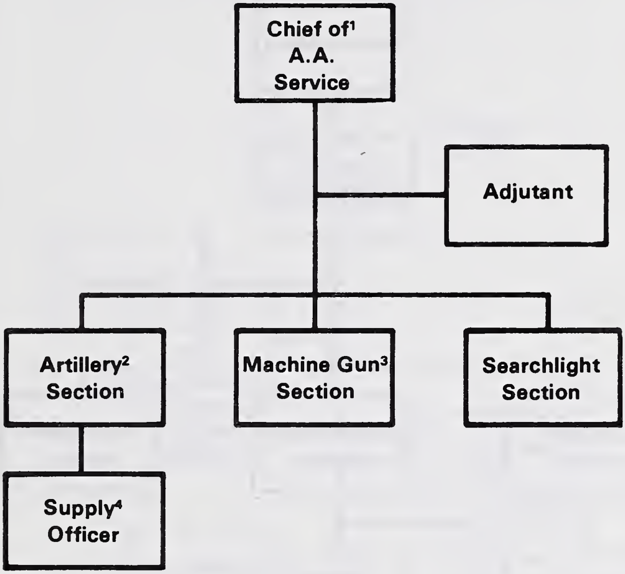


Grade Distribution

Brigadier General:	1	Master Gunner:	1
Colonel:	1	Sergeant:	1
Major:	1	Corporal:	3
Captain:	6	Wagoner:	2
First Lieutenant:	3	Privates First Class:	7
Sergeant Major Senior Grade:	1	Clerk:	2

ORGANIZATION

Headquarters, A.A. Service of an Army, A.E.F.



Personnel Distribution

Colonel:	1
Lieutenant Colonel:	1
Major or Captain:	2
Captain:	2
Sergeant Major Senior Grade:	1
Sergeant Major Junior Grade:	1
Wagoner:	2
Sergeant:	5
Cooks:	2
Privates First Class:	10

Notes

[1] Headquarters a staff element of Army Artillery Headquarters.

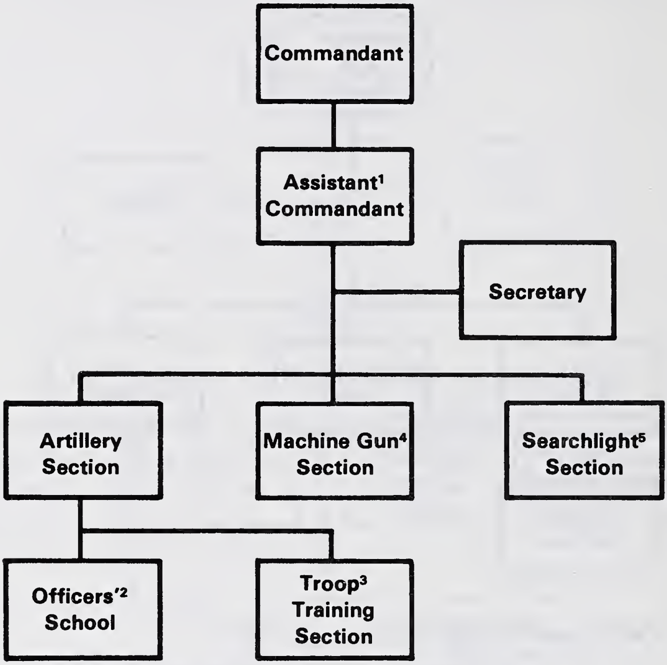
[2] Lt. Col was the Artillery Officer and served as deputy commander; required branch was C.A.C.

[3] Machine gun officer was Infantry; Searchlight Officer was Corps of Engineers.

[4] Sergeant Major Junior Grade was Regimental Supply Sgt.

ORGANIZATION

A.A.A. School



Notes

[1] Previously entitled "Director"

[2] At the Chateau d'Arnouville

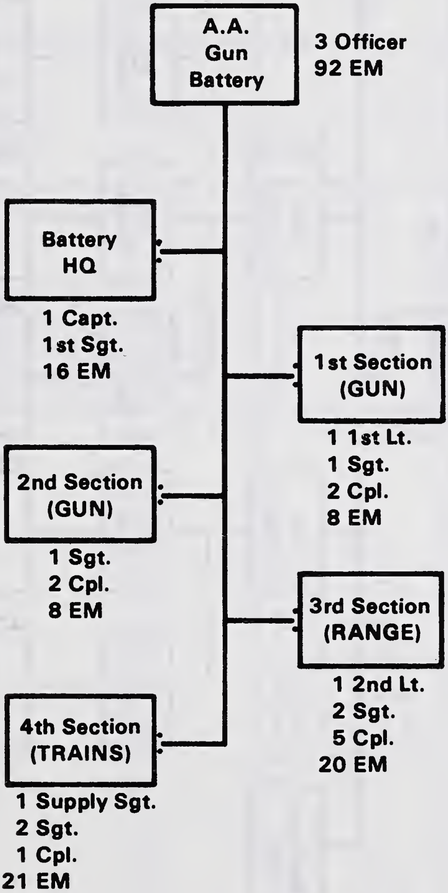
[3] At Fort de Stains, Fort Montmorency, Fort Mont Lignon, and Le Bourget Aerodrome

[4] At Montaubon

[5] At Langres, Fort Mont Valerian, Champigny, and Colombey-les-Belles

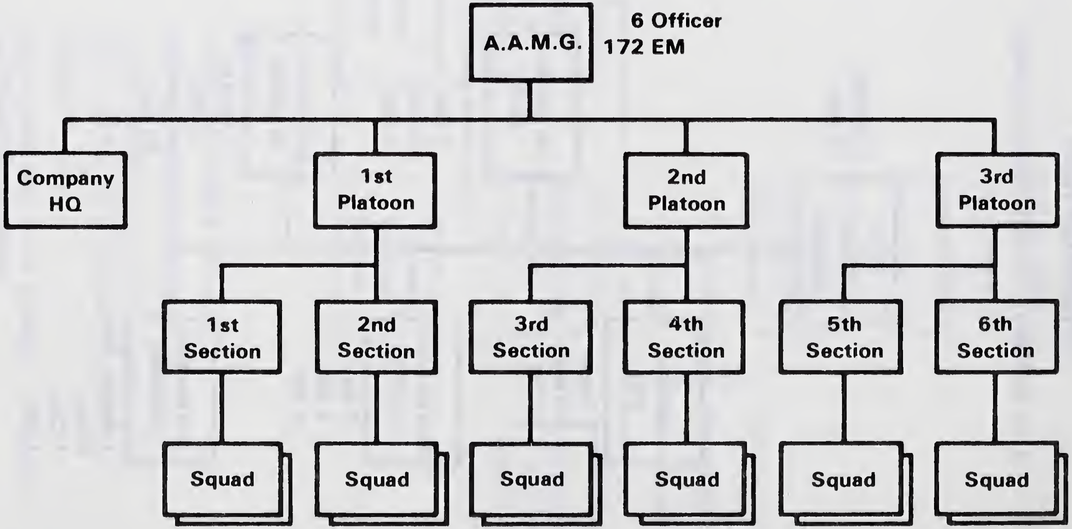
ORGANIZATION

A.A. Battery, 75-mm Auto-Cannon



ORGANIZATION

A.A. M.G. Company



Each Section had one Sgt. and 2 Pfcs. Each Squad was led by a Cpl. and had 8 Pvts. Each Squad operated one gun.

SUMMARY OF A.A. UNITS DEPLOYED FOR DUTY IN THE FIELD

UNIT	COMMANDING OFFICER	CAMPAIGNS	PLANES DOWNED	DSCs	CITATIONS
1st A.A. M.G. Bn.	Maj. H.D. Cushing, Inf, O.R.C.	Aisne-Marne Defensive Sector (Champagne) Defensive Sector (Lorraine) Meuse-Argonne (Company A) St. Mihiel	24 Co. A - 2 Co. B - 5 Co. C - 9 Co. D - 8	1	Croix de Guerre with Gilt Star
2nd A.A. M.G. Bn.	Maj. O.J. Whitney, Inf., O.R.C.	Meuse-Argonne St. Mihiel (Company A)	17 Co. A - 5 Co. B - 4 Co. C - 7 Co. D - 1	3	
1st A.A. Bn. (C.A.C.)	Maj. R.W. Collins, C.A.C. Maj. R.E.M. Goolrick, C.A.C. Maj. J.F. Leak, C.A.C.	Meuse-Argonne	11 Btry. A. - 2 Btry. B - 9		Croix de Guerre with Bronze Star (H&S Company)
2nd A.A. Bn. (C.A.C.)	Maj. H.A. Schwabe, C.A.C. Maj. G. Packard, C.A.C.	St. Mihiel	5 Btry. A - 3 Btry. B - 2		
8th A.A. Sector	Capt. G.P. Anderson, C.A.C. Lt. Col. R.W. Collins, C.A.C. Maj. C.N. Wilson, C.A.C.				
9th A.A. Sector	Capt. R.R. Robertson, C.A.R.C. Capt. B.L. Flanigen, C.A.C.				

SUMMARY OF A.A. UNITS DEPLOYED FOR DUTY IN THE FIELD (CONTINUED)

UNIT	COMMANDING OFFICER	CAMPAIGNS	PLANES DOWNED	DSCs	CITATIONS
10th A.A. Sector	Maj. R.R. Robertson, C.A.R.C.				
2nd A.A. Btry.*	Capt. W.W. Rhein, C.A.N.G. Capt. A.E. Mellon, C.A.R.C. Capt. C.N. Wilson, C.A.C.		1		
5th A.A. Btry.	Capt. G.H. King, C.A.N.G.	Meuse-Argonne	1		
6th A.A. Btry.*	Capt. P.N. Pittenger, C.A.R.C.	Defensive Sector (Lorraine)			
7th A.A. Btry.*	Capt. R.V. Ladd, C.A.N.G.	St. Mihiel Meuse-Argonne			
56th Engineers (Searchlight)	Lt. Col. J.C. Gotwals, C.E.	St. Mihiel Meuse-Argonne Defensive Sector (Champagne) Defensive Sector (Lorraine) Aisne-Marne	1		

*Separate A.A. Batteries, assigned to A.A. Sectors, but with specific credit for independent front-line duty.

BIBLIOGRAPHY

I. Archival and Documentary

National Archives and Records Service, Washington, D.C.

Records Group 120, Records of the A.E.F. entries 741 through 745 and 911, Records of the Anti-Aircraft Service, American Expeditionary Forces, 1917-1919, and Entries 22 (Folders 231, 384), 268 (Folders 1036, 256, 271, 291), and 765 (Folders 60-68).

Records Group 120, Records of the A.E.F. Entries 735 and 1245, Records of the Railway Artillery Reserve, American Expeditionary Forces, 1917-1919.

United States Army Center of Military History, Washington, D.C.

Artillery Lineage Files, Organizational History Branch

War Department General Orders, Reference Branch

United States Army Military History Institute, Carlisle Barracks, Pennsylvania

Larry H. Addington Papers

Ben J. Cothran Papers

Col. W. C. Foote Papers

Maj. Gen. Johnson Hagood II Papers

Col. William C. Koenig Papers

World War I Experiences Questionnaires

Army War College Course Records

United States Military Academy, West Point, New York

Library, Special Collections. Cullum Files pertaining to U.S.M.A. graduates.

Association of Graduates, U.S.M.A. Cullum Files pertaining to living U.S.M.A. graduates.

II. Interview and Correspondence

Mr. William C. Cameron, formerly Sergeant, Battery A, 3rd A.A. Battalion (C.A.C.)

Col. Bird S. DuBois, U.S.A., Ret., formerly Major commanding 6th A.A. Battalion (C.A.C.)

Mr. Munro Fox, formerly Sergeant, 18th Platoon, Company D, 56th Engineers (Searchlight)

Brig. Gen. Joseph S. Robinson, U.S.A., Ret., member of USMA Class of June 1918, C.A.C.

Mr. Alvin Clark Smith, formerly Captain commanding Battery A, 1st A.A. Battalion (C.A.C.)

Mrs. Constance O'Toole and Mrs. Michelle Bratton, *re* their father, Mr. Samuel Fowle Telfair, D.S.C., formerly 2nd Lt., 2nd A.A. M.G. Battalion.

Mr. Charles J. Utterback, formerly Sergeant, 5th A.A. Battery.

III. Published Documents

[Army War College Historical Section]. *The Genesis of the American First Army.* Washington: USGPO, 1938.

Ayres, Col. Leonard P. *The War With Germany. A Statistical Summary.* Washington: USGPO, 1919.

[Department of the Army. Adjutant General's Office]. *U. S. Army Register.* Washington: USGPO, annually.

[Headquarters, A.E.F.]. *Report of the First Army, American Expeditionary Forces. Organization and Operations,* 1920.

Maurer, Maurer (editor). *The U. S. Air Service in World War I.* Washington: The Office of Air Force History, 4 Volumes, 1978-1979.

[Office of the Adjutant General, U.S. Army]. *American Decorations. A List of Awards of the Congressional Medal of Honor, the Distinguished-Service Cross and the Distinguished-Service Medal Awarded Under the Authority of the Congress of the United States, 1862-1926.* Washington, USGPO, 1927.

UNITED STATES ARMY IN THE WORLD WAR, 1917-1919. Washington, USGPO, 17 Volumes, 1948.

[United States Army]. Field Manual 44-1. U.S. Army Air Defense Artillery Employment, 31 December 1981.

[War Department]. *Battle Participation of Organizations of the American Expeditionary Forces in France, Belgium and Italy 1917-1918.* Washington: USGPO, 1920.

[War Department]. *Coast Artillery Drill Regulations. United States Army. 1914.* Washington: USGPO, 1917.

[War Department]. *Notes On Anti-Aircraft Guns* (War Department Document #575). Washington: USGPO, 1917.

[War Department]. *Order of Battle of the United States Land Forces in the World War 1917-19.* Washington: USGPO, 4 Volumes, 1949.

[War Department]. *Rules of Land Warfare.* Washington: USGPO, 1917.

IV. Memoir Literature

Hagood, Maj. Gen. Johnson II. *The Services of Supply. A Memoir of the Great War.* New York: Houghton Mifflin Company, 1927.

Pershing, Gen. John J. *My Experiences in the World War.*- New York: Frederick A. Stokes Company, 2 Volumes, 1931.

Quane, Maj. Oliver J. *West of the Meuse.* Chicago: n.p., 1919.

Stone, Ernest. *Battery B. Thru the Fires of France.* Los Angeles: Wayside Press, 1919.

V. Secondary

[Alumni Association, U.S.N.A.]. *Register of Alumni, Graduates, and Former Naval Cadets and Midshipmen.* Annapolis: annually.

[Association of Graduates, U.S.M.A.]. *Register of Graduates and Former Cadets of the United States Military Academy.* West Point: Association of Graduates, annually.

Bachelor, John, and Ian Hogg. *Artillery.* New York: Ballantine Books, 1972.

Braddy, Haldeen. *Pershing's Mission In Mexico.* El Paso: Texas Western Press, 1966.

Downey, Fairfax. *Sound of the Guns.* New York: David McKay Company, Inc., 1956.

Ganoe, Col. William Addleman. *The History of the United States Army.* Ashton, Md.: Eric Lundberg, 1964.

History of the 58th U.S. Artillery, C. A. C. New York: Wyncoop Hallenbeck Crawford Company, n.d., ca. 1920.

[Infantry Journal]. *The Coast Artillery Corps of the United States Army.* Chicago: Rand McNally & Company, 1943.

Johnson, Curt. *Artillery.* London: Octopus Books, Ltd., 1975.

Laframboise, Leon W. *History of the Artillery, Cavalry, and Infantry Branch of Service Insignia.* Steelville, Mo.: Watson Publishing Company, 1976.

Parsons, Col. William Barclay, C.E., D.S.O. *The American Engineers In France.* New York: D. Appleton and Company, 1920.

Thomas, Capt. Shipley. *The History of the A. E. F.* New York: George Doran Company, 1920.

[United States Army Air Defense School]. *Air Defense. An Historical Summary.* Ft. Bliss, Texas: USAADS, 4 volumes, 1965.

Weigley, Russell F. *History of the United States Army.* New York: The MacMillan Company, 1967.

Williams, T. Harry. *Americans At War. The Development of the American Military System.* LSU Press, 1960.

VI. Periodical Literature

Antiaircraft Journal

Assembly. Magazine of the Association of Graduates, U.S.M.A.

Coast Artillery School

Infantry Journal

Journal of the United States Artillery

Journal of the United States Infantry Association

Liaison. The Courier of the Big Gun Corps.

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VITA

Major Charles Edward Kirkpatrick is an Air Defense Artillery officer who has served in units in Europe and in the United States. He graduated from Wake Forest College in 1969 with the Bachelor of Arts, *cum laude,* and with Honors in History, and received the Master of Arts from Wake Forest University in 1970. He was a Ford Fellow at Emory University, where he is completing the Ph.D. Maj. Kirkpatrick served as Assistant Professor in the Department of History at the United States Military Academy, and is presently assigned to the Department of Tactics, U.S. Army Air Defense Artillery School.

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Brig. Gen. James A. Shipton, D.S.M. First Chief of Anti-Aircraft Service and father of the Air Defense Artillery. He created the arm and commanded it through June 1918.

Battery B, 1st A.A. Battalion, in action at Montreuil, France, 15 June 1918. Gun commander, a sergeant, stands at left.